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ABSTRACT

This is one of four performance assessment resources booklets for Level III of the Intermediate Science Curriculum Study (ISCS). The four booklets are considered one of four major subdivisions of a set of individualized evaluation materials for Level III developed as a part of the ISCS Individualized Teacher Preparation (ITP) program. Each of these booklets, which accompanies a pair of the student texts, is a teacher's handbook to be used in identifying the appropriate performance checks with which to evaluate each student. Each also indicates how to set up testing situations, correct responses, and give remedial help. This manual covers Environmental Science (ES) and Well-Being (WB) in three units. Each unit begins with a summary table that includes the objectives and performance checks of the unit. Immediately following each table comes the bulk of resource material for each objective introduced in that unit. Suggested ways teachers can use the manual are also included. (HM)

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INTERMEDIATE SCIENCE CURRICULUM STUDY

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INDIVIDUALIZED TESTING SYSTEM

Performance Assessment Resources

ISCS LEVEL III

ES-WB

SE 028 485

SILVER BURDETT
GENERAL LEARNING CORPORATION
Morristown, New Jersey · Park Ridge, Ill. · Palo Alto · Dallas · Atlanta

INDIVIDUALIZED TESTING SYSTEM

ALL LEVELS
Individualizing Objective Testing (an ITP module)
Evaluating and Reporting Progress (an ITP module)

LEVEL I
Performance Objectives, ISCS Level I
Performance Checks, ISCS Level I, Forms A, B, and C
Performance Assessment Resources, ISCS Level I, Parts 1 and 2

LEVEL II
Performance Objectives, ISCS Level II
Performance Checks, ISCS Level II, Forms A, B, and C
Performance Assessment Resources, ISCS Level II, Parts 1 and 2

LEVEL III
Performance Objectives, ISCS Level III
Performance Checks, ISCS Level III, ES-WB, Forms A, B, and C
WYY-IV, Forms A, B, and C
IO-WU, Forms A, B, and C
WW-CP, Forms A, B, and C
Performance Assessment Resources, ISCS Level III, ES-WB
WYY-IV
IO-WU
WW-CP

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FOREWORD

To implement an educational approach successfully, one must match the philosophy of evaluation with that of instruction. This is particularly true when individualization is the key element in the educational approach. Yet, as important as it is to achieve this match, the task is by no means simple for the teacher. In fact, without specific resource materials to help him, he is apt to find the task overwhelming. For this reason, ISCS has developed a set of individualized evaluation materials as part of its Individualized Teacher Preparation (ITP) program. These materials are designed to assist teachers in their transition to individualized instruction and to help them tailor their assessment of students' progress to the needs of all their students.

The two modules concerned with evaluation, *Individualizing Objective Testing* and *Evaluating and Reporting Progress,* can be used by small groups of teachers in in-service settings or by individual teachers in a local school environment. Hopefully, they will do more than give each teacher an overview of individualized evaluation. These ITP modules suggest key strategies for achieving both subjective and objective evaluation of each student's progress. And to make it easier for teachers to put such strategies into practice, ISCS has produced the associated booklets entitled *Performance Objectives, Performance Assessment Resources,* and *Performance Checks.* Using these materials, the teacher can objectively assess the student's mastery of the processes, skills, and subject matter of the ISCS program. And the teacher can obtain, at the moment when they are needed, specific suggestions for remedying the student's identified deficiencies.

If you are an ISCS teacher, selective use of these materials will guide you in developing an individualized evaluation program best suited to your own settings and thus further enhance the individualized character of your ISCS program.

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THE ISCS INDIVIDUALIZED TESTING SYSTEM

The ISCS individualized testing system for each level of ISCS is composed of four major subdivisions:

1. The ITP modules *Evaluating and Reporting Progress* and *Individualizing Objective Testing*,
2. *Performance Objectives*,
3. *Performance Checks* in three alternate forms, and
4. *Performance Assessment Resources*.

Evaluating and Reporting Progress presents a comprehensive overview, with many refinements, for individualizing the grading and reporting of students' progress, based on both subjective and objective criteria. The module *Individualizing Objective Testing* describes more specifically those ISCS evaluation materials which have objective criteria – the performance objectives, checks, and resources – and it presents practical suggestions for their use. These two modules should be considered prerequisite to successful use of the other ISCS evaluation materials.

Each of the *Performance Objectives* booklets contains a composite list of selected measurable objectives considered important to a given level of the ISCS program. However, many of the long-range goals and aims that are at the heart of the ISCS program do not lend themselves to being expressed as measurable performance objectives. Thus, these booklets should not be construed as being all-inclusive anthologies of all the possible learning outcomes of ISCS.

Each of three *Performance Checks* booklets contains an equivalent but alternative set of performance checks which were developed to assess the students' achievement of the objectives stated in the *Performance Objectives* booklets.

The *Performance Assessment Resources* booklet is a teacher's handbook to be used in identifying the appropriate performance checks with which to evaluate each student. The booklet also indicates how to set up testing situations, correct responses, and give remedial help.

NOTES TO THE TEACHER

An overview of evaluation, including both objective and subjective criteria, is given in the module *Evaluating and Reporting Progress* and many aspects of this booklet are described in more detail in Chapter 3 of the module *Individualizing Objective Testing*. These notes are meant to augment, not replace, Chapter 3 of that module. As you use this booklet, you will begin to see ways to modify its suggestions to meet your needs better. You are encouraged to enter your modifications at the points at which they apply. Only by altering these materials will you evolve an evaluation system best suited to your own classroom environment. It is important to remember that only principles involved in objective criterion-referenced evaluation are applied in this booklet. Therefore, you will obviously want to incorporate subjective criteria also.

Texts, Units, and Chapters

There are four *Performance Assessment Resources* booklets for Level III of ISCS. Each of these booklets accompanies a pair of the student texts. The pairs of texts and their abbreviated symbols are as follows:

Environmental Science - Well-Being (ES-WB)
Why You're You - Investigating Variation (WYY-IV)
In Orbit - What's Up (IO-WU)
Winds and Weather - Crusty Problems (WW-CP)

The testing materials for each text are divided into units, thus breaking up each Level III text into easily handled sections of correlative chapters and related excursions. The relationships between the units and the chapters of *Environmental Science* and *Well-Being* are shown in Table 1.

TEXT	UNIT	CHAPTERS
ES	1	1 and 2
ES	2	3 thru 5
ES	3	6 thru 8
WB	1	1
WB	2	2 and 3
WB	3	4 thru 6

Table 1

Most units include the objectives and performance checks for two or three chapters and their related excursions. You will recall that the number before the hyphen in the identification number for an excursion states the chapter to which it is related. The individual objectives and performance checks for each unit are to be selected and used when the student has completed the designated chapters and any excursions he wishes to do. This delay should ensure that there is no premature assessment of the

student's achievement of concepts and skills which may be introduced early in a unit, but which require development throughout the unit. Thus, subdividing units for assessment purposes should be done with great care. Keep this in mind if you decide to spot check students as they proceed through units, rather than conducting a formal evaluation at the end of the unit.

Summary Table

Each unit begins with a double-spread "Performance Check Summary Table." The left-hand page of the "Summary Table" serves as a table of contents for the unit. It provides a great deal of information about the objectives pertinent to the unit. Usually about twenty-five objectives for each unit are introduced for the first time in each "Summary Table." A maximum of ten relevant objectives from previous units are reintroduced.

On the left-hand side of the "Summary Table" is a list of code numbers, each of which is unique to one objective within the level. Two examples of code numbers and their meaning are illustrated in Figure 1 below.

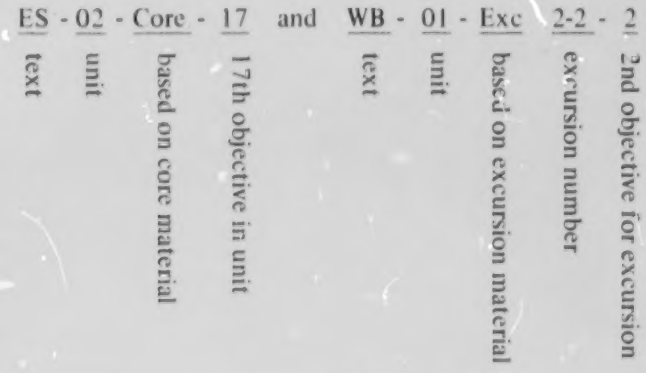


Figure 1

The core objectives appear first in an order that corresponds roughly to the text development. Exceptions to this ordering were made to place objectives based on related processes or content together. Objectives based on remedial excursions are numbered as core objectives because they involve skills essential to success in core activities. Next are listed the general or enrichment excursion objectives, and these are followed by objectives from prior units which are again considered important to the students' progress. These repeated objectives are easily spotted, as a capital R (for Repeated) appears after their identifying code number, giving a listing such as ES-02-Core-17R. The specific resource aids to be used with repeated objectives are given in the units designated by the code number (unit 2 in the just-cited example), and the information is not repeated each time within the textual material that follows the "Summary Table."

Each objective code number is followed by a short descriptive statement of that objective. These short statements were written, using the students' vocabulary. They should be helpful in communicating the objectives to the students should you desire to do so. Ways to involve your students in selecting the objectives are discussed in the module *Individualizing Objective Testing*.

The right side of the "Summary Table" is made up of eleven columns. Letters are used in the first five to designate the characteristics of the performance check. The letters and their meanings are as follows:

M - Completing the check requires regular ISCS materials.
O - An observer should view the student's performance as he does the check.
P - Completing the check requires the use of specially prepared materials.
Q - The answer to the check is of the quick-scoring variety.
T - The check will require more than three minutes of the student's time.

Check marks in the next four columns help the teacher assign appropriate performance checks to individual students. The first of these columns is entitled "Basal." Achieving the objectives checked in this column is considered essential to the student's progress. These performance checks may be assigned to any student; however, better students will find that many of these offer little or no challenge.

Check marks in the columns headed "Math," "Reading," and "Concept" indicate performance checks which require a higher level of computational skills, a higher reading level, or a greater ability to think abstractly than the performance checks for most other objectives. Performance checks which have no marks in any of these four columns are considered to be more than basal, but the skills which they require are within the capabilities of most students.

A tenth column lists the action verb that identifies the theoretical mental process required of the student to complete the performance check for the objective. A precise definition of each of the verbs used to designate mental processes is given in the module *Individualizing Objective Testing*.

Finally, in the eleventh column, space is provided for notes. Although you will find an occasional comment printed here, this space is mainly for your notes. It's a good place to put any special instructions or preparations you have found helpful.

As mentioned earlier, some objectives are repeated objectives – ones that have appeared in previous units. When such an objective is listed again in the "Summary Table," its classification as basal or as presenting math, reading, or conceptual difficulties is likely to be different. This change most often derives from a change in purpose. The first time a concept or skill is introduced, the intent may be only to introduce students to it. When reintroduced in a later unit, the skill or concept is frequently developed and used extensively. Thus, in the "Summary Table" for the earlier unit, objectives related to a concept are likely to be classified as conceptually difficult for many students, whereas in the later units, the same objective might be reclassified as basal.

Organization of Resources

Immediately following each "Summary Table" comes the bulk of the resource material for each objective introduced in that unit. Once more, each objective is identified by its code number, but this time it appears in bold, black print in the outer margin directly beside the applicable resource. A pair of horizontal lines separates the resources for each objective from those for the previous and following objectives. When no horizontal line appears at the bottom of a page, the resource material for the objective is continued on the next page.

The functions of the various component resources provided for the objectives are listed below. Two of the components (Regular Supplies and Special Preparations) appear only when they are needed for a particular check. When the performance check does not require any supplies, the supply headings are omitted. Observe the functional descriptions carefully – they are the keys to the types of resource materials provided in the *Performance Assessment Resources* booklet.

COMPONENTS	FUNCTION
Descriptive Statement	This statement duplicates the one that appears in the "Summary Table." If you misread a code number and find yourself looking at material for the wrong objective, this should stop you and send you back to the Table to check. More important, it should briefly indicate to you the basic purpose of the objective.
Objective	The underlined verb in this statement of the objective indicates the theoretical mental process that the student will perform. The phrase following it indicates the content or process skill which the student must perform. A complete description of the verbs and their meanings can be found in the ITP module *Individualizing Objective Testing*.
Regular Supplies	This section lists any ISCS equipment that the student will need – regular equipment that is being used in the unit on which the student is being evaluated or in previous units.
Special Preparations	Don't overlook this section. It lists and describes materials the teacher must collect or prepare in some way. Included are special solutions, special packaging, and labels required for materials for evaluation purposes. The section also specifies particular grids, charts, or maps that the students will need to complete the check.

Student Action	This is a general description of what the student should do in responding to any of the three performance checks based on the objective. If his expected response is to state a general principle, it is listed in this section. If the three performance checks require specific answers, they are provided below the general statement in the student action.
Performance Check A	Performance Check A is fully stated to allow for a quick review of the statement of the tasks as they are presented to the student. Performance Checks B and C generally present slightly different situations or wording but ask students to perform equivalent tasks.
Remediation	This final section outlines suggested action that can be taken if the student fails to achieve the objective. In some of the remediations, the listed steps are sequential; in others the steps represent options from which it is suggested that you select one or two. Some remediations suggest referring the student to review sections of the core, doing an excursion, or reviewing a self-evaluation question and its response.

How To Find It

Locating a particular objective whose number you know is easy. Just thumb through the pages watching for the unit number which appears in large black print above the word *core* or *excursion* in the margins. But suppose you wish to locate an objective pertinent to a given section or chapter of the text and you don't know the number. Here is a procedure to follow:

1. Determine the unit in which the chapter occurs, using Table 1.
2. Thumb through this booklet until you find that unit number as the beginning digits of any code number appearing in large black print in the outer margin.
3. Look for the "Summary Table" at the beginning of that unit.
4. Use the "Summary Table" to determine the number of the objective you seek.

Be Selective

The resource books for each level contain many more objectives and resources than any one teacher can use. If you add objectives and resources, and you probably will, your list will expand further. The most successful user of this catalog will be the teacher who picks and chooses selectively to meet the specific needs of his students. Therefore, once you are familiar with this book, it is imperative that you establish a system of selecting and assigning checks to the student. Suggestions on how to establish this are given in Chapter 3 of *Individualizing Objective Testing*.

Whatever selection and assignment system you develop, it must give due regard to the individual student's differences. For example, if you administer too many recall

performance checks to a high-ability student, he will not only be bored but you will also fail to assess his progress adequately. Too many difficult items administered to a low-ability student leads to frustration and reinforcement of the "I knew I couldn't do it" attitude. On the other hand, even the best students need their egos inflated by some questions that they can answer easily. And, the less able student needs to be appropriately challenged. Be careful, too, of placing too much emphasis on objectives. This may lead students to place undue emphasis on tests, thus slowing their progress to the extent that they lose interest in the story line.

Assigning Performance Checks

How many performance checks should be assigned to a student? This question has no fixed answer. The primary concern is that performance checks provide the needed feedback to both you and the student. If, in your judgment, evaluating a student on a particular unit is unnecessary, then don't do it. If you feel a student needs to be evaluated, then assign an appropriate selection of performance checks. *Individualizing Objective Testing* makes suggestions about how to do this. In no case should any student be assigned all the performance checks or even a random sampling of them. Such a practice would subject the student to tasks which would be either unduly difficult and time-consuming or perhaps too simple for him and therefore meaningless, time-wasting activities.

You may wish to specify the equivalent form (A, B, or C) of performance checks that the student should do when assigning the specific performance check numbers. There is, of course, no difference in their difficulty level. In any case, have the student record both the number and the letter of the specific performance check he does. These numbers and letters should appear on his answer sheet, as they will be needed to check his response. Since the numbers are unique within each ISCS level, there is no need to use a student's time copying the performance checks. Listing the number with the response is sufficient. It's a good idea to remind students frequently that their answers must go on separate paper -- not in the *Performance Checks* books.

As you assign checks, keep the supply situation in mind. You won't want too much of some equipment tied up in Special Preparations at any one time. To avoid this, keep abreast of the range of your students' progress and prepare only those materials you anticipate needing, referring to the P's appearing in the third column on the right-hand page of the "Summary Table." Batteries, of course, will need replacement or recharging occasionally, and specially boxed supplies should be checked periodically for missing or nonfunctioning parts.

At the back of the *Performance Assessment Resources*, you will find grids, charts, and maps identical to those the students must use in certain performance checks. The grids, charts, and maps at the back are suitable for reproduction. You may make copies directly, using one of the well-known commercial copiers. For large quantities at low cost, make a master by the thermo process and use it to make duplicates. If you make copies in either of these ways, your students will not be wasting time drawing grids, charts, and maps, and you will feel free to assign objectives that need these.

Environmental Science ES

ES 01

Chapters 1 and 2

Excursions 1-1 thru 2-2

Performance Check

Summary Table

Objective Number	Objective Description
ES-01-Core-1	Explains the rapid spread of disease today compared with the Middle Ages
ES-01-Core-2	Graphs on a map the movement of an epidemic
ES-01-Core-3	Compares the rates at which diseases spread in rural and in urban areas
ES-01-Core-4	Analyzes the possibility of the spread of an epidemic today
ES-01-Core-5	Lists conditions favorable to epidemics
ES-01-Core-6	Selects the condition most likely to curb the spread of contagious diseases
ES-01-Core-7	Defines the term *components*
ES-01-Core-8	Lists components of a given system
ES-01-Core-9	Defines *system*
ES-01-Core-10	Lists the components of a specific system
ES-01-Core-11	Explains why the output of organisms does not seem to accumulate
ES-01-Core-12	Recognizes input and output of a component
ES-01-Core-13	Defines the term *producer*
ES-01-Core-14	Defines *consumer* in the biological sense
ES-01-Core-15	Defines the biological meaning of *decomposer*
ES-01-Core-16	Recognizes examples of producers, consumers, and decomposers
ES-01-Core-17	Explains why governments make laws against minor acts of pollution by individuals
ES-01-Core-18	States whether an object influences its surroundings

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
										applies	
			P		T	√				applies	
						√				applies	
										applies	
						√				recalls	
				Q				√		applies	
						√				recalls	
						√				applies	
						√				recalls	
						√				applies	
						√				applies	
						√				applies	
						√				recalls	
						√				recalls	
						√				recalls	
				Q		√				classifies	
										applies	
					T	√				applies	

ES 01

Objective Number	Objective Description
ES-01-Core-19	Recognizes direct and indirect influences
ES-01-Core-20	Predicts the results of change in a balanced system
ES-01-Core-21	Predicts the results of a change in environmental input-output
ES-01-Core-22	Explains how it is possible for people in industrial nations to affect their environment more than do people in nonindustrial nations
ES-01-Core-23	Selects organisms which affect the environment
ES-01-Core-24	Describes the input and output of gases in an atmosphere containing different kinds of living things
ES-01-Core-25	Lists input to and output from the human body
ES-01-Core-26	Describes the result of upsetting the balance of a system
ES-01-Core-27	Cleans up the work area at the close of class
ES-01-Core-28	Cooperates with lab partners
ES-01-Core-29	Returns equipment promptly to storage areas
ES-01-Core-30	Responds to text questions
ES-01-Core-31	Shows care for laboratory materials
ES-01-Exc 1-1-1	Plots data and draws a line of best fit
ES-01-Exc 2-1-1	Judges whether a particular chemical reaction is possible
ES-01-Exc 2-1-2	Selects examples of parts of the ISCS particle model

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
				Q		✓				classifies	
										applies	
									✓	applies	
					T				✓	generates	
				Q		✓				applies	
						✓				applies	
										applies	
						✓				applies	
		O				✓				chooses	
		O				✓				chooses	
		O				✓				chooses	
		O				✓				chooses	
		O				✓				chooses	
			P			✓				applies	
										applies	
				Q		✓				classifies	

ES 01

Objective Number	Objective Description
ES-01-Exc 2-1-3	Recognizes methods for increasing the rate of a reaction
ES-01-Exc 2-1-4	Explains why a substance must be heated before it will burn in air
ES-01-Exc 2-1-5	Matches terms from the ISCS particle model with their definitions
ES-01-Exc 2-1-6	Selects the relationship between temperature change and energy in a reaction
ES-01-Exc 2-2-1	Lists important considerations when eliminating a pest species

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
				Q		✓				applies	
									✓	applies	
				Q		✓				recalls	
									✓	applies	
									✓	recalls	

ES 01 Core 1

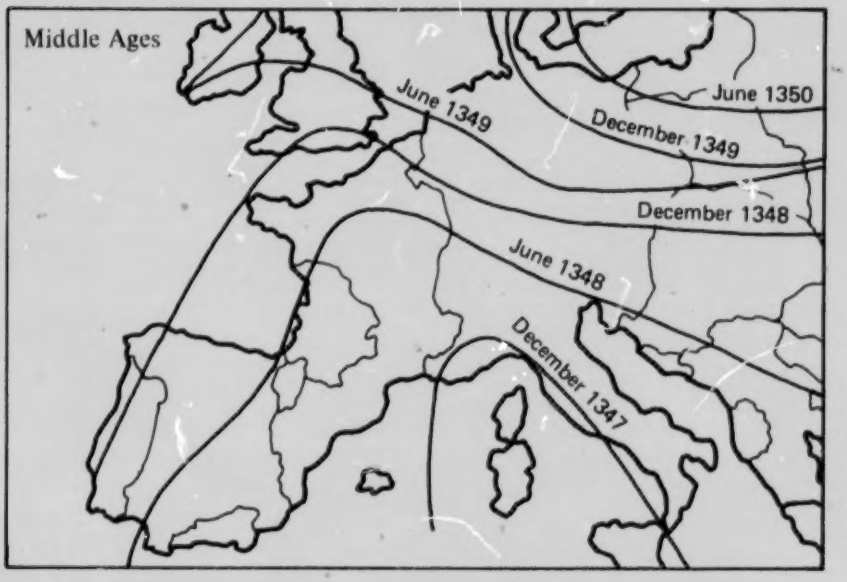
Explains the rapid spread of disease today compared with the Middle Ages.

The student applies the concept that diseases are caused by germs which may be carried by people, animals, or objects from one place to another.

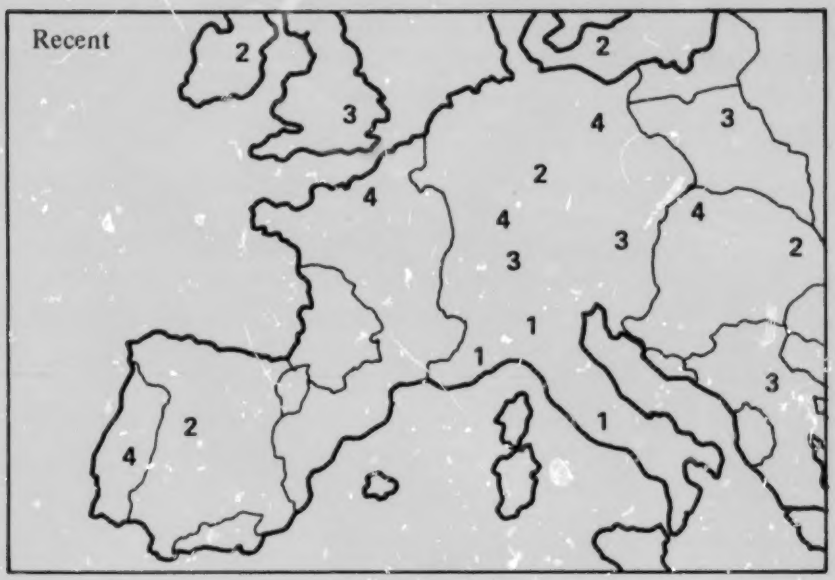
Student Action: Stating an explanation which includes the idea that because there is much more rapid and frequent movement of people, animals, and objects over long distances in modern times than there was in the Middle Ages, diseases can spread very rapidly.

Performance Check A: Look at the maps below. During the Middle Ages, diseases seemed to break out in one place and then spread slowly and regularly from city to city. Now diseases such as flu epidemics seem to break out quickly in many different cities in irregular patterns. Explain why diseases seem to spread much more rapidly and irregularly now than in the Middle Ages.

Epidemics in Europe



(Dated lines represent time of outbreak)



KEY

SYMBOL	OUTBREAK REPORTED
1	lst week
2	2nd week
3	3rd week
4	4th week

Remediation: (1) Refer the student to the letter on pages 1 and 2. (2) Ask if there are differences between the ways and speeds that people travel today and in the Middle Ages. (3) Does he know that it is possible for germ-carrying rodents or insects to hide on boats, trains, ships, and aircraft? (4) Have the student redo the performance check. (5) Check his answer to Self-Evaluation 1-6.

Graphs on a map the movement of an epidemic.

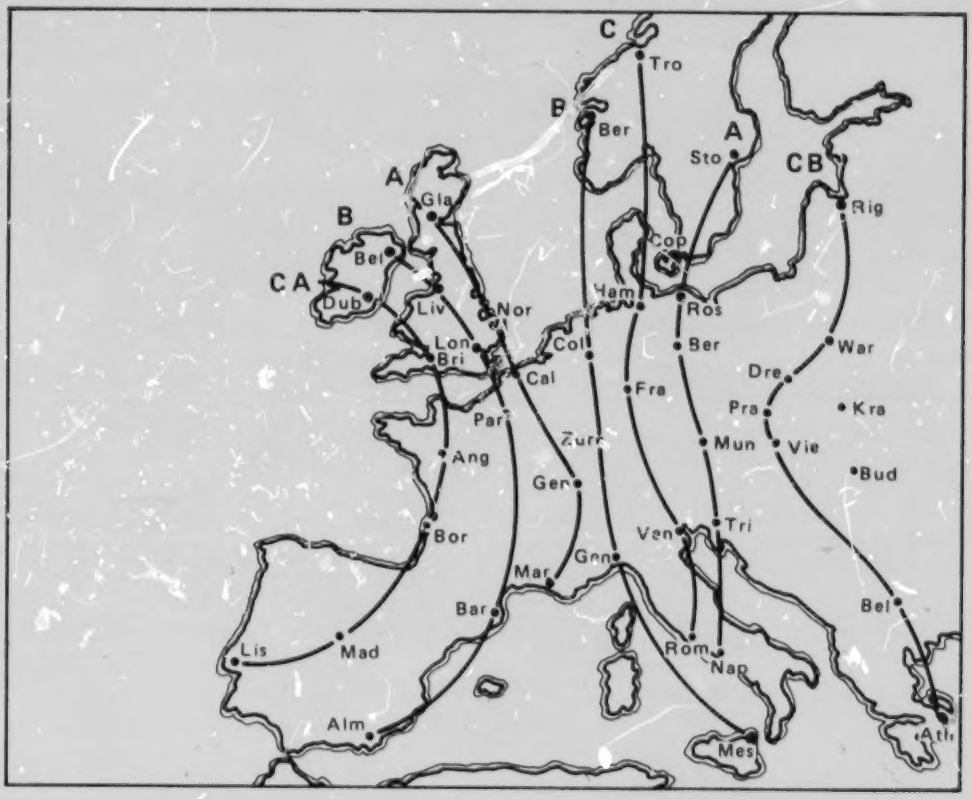
The student applies the procedure for drawing lines of best fit.

Special Preparations: Make copies of the map labeled ES-01-Core-2 that appears in the special section at the back of this book.

ES 01

Core 2

Student Action: Drawing smooth curves joining all the cities affected at the same time as shown. Only three curves (labeled A, B, or C) apply to each check.



Performance Check A: Get a copy of the map labeled ES-01-Core-2 from your teacher. Suppose that outbreaks of smallpox were recorded as shown below.

MONTH AND YEAR	NEW CITIES AFFECTED
January, 1840	Lisbon, Madrid, Bordeaux, Angers, Bristol, and Dublin
July, 1840	Marseilles, Geneva, Calais, Norwich, and Glascow
January, 1841	Stockholm, Rostock, Berlin, Munich, Trieste, and Naples

Show the spread of the epidemic by drawing a line of best fit for each one of the dates given in the table above.

Remediation: (1) Refer the student to the sample line of best fit in Figure 1-1 on page 4 of the text, and have him review the completed Figure 1-1 in his *Record Book*. (2) If ISCS Levels I and II texts are available, refer him to Excursion 5 in Level I or to Excursion 7-1, Part B, in Level II. These excursions cover drawing lines of best fit.

Compares the rates at which diseases spread in rural and in urban areas.

The student applies the concept that the rate of spread of communicable diseases varies with population density.

Student Action: Stating that the disease is likely to spread more rapidly in the city than in a rural area and that communicable diseases are likely to spread more rapidly in situations where contacts between people are frequent.

Performance Check A:

1. Is a disease that spreads from one person to another likely to spread more rapidly in a large city or in a rural area?
2. Explain your answer.

Remediation: (1) Have the student read the first paragraph on page 5 for some ideas. (2) Ask him if such conditions as crowding and careless piling of rubbish are more likely to be dangerous in cities or in rural areas. (3) Have the student do or review Excursion 1-1, with particular attention to the first paragraph on the top of page 96.

ES 01 Core 3

Analyzes the possibility of the spread of an epidemic today.

The student applies the concept of the conditions necessary for disease to spread.

Student Action: Stating that an epidemic could occur and, in effect, that the crowded and unsanitary living conditions that encourage the spread of epidemic disease still exist today.

Performance Check A:

1. Could an epidemic of a disease like the Black Death possibly occur today?
2. Explain your answer.

Remediation: (1) Refer the student to the first paragraph on page 5. (2) Have the student review Self-Evaluation 1-6. (3) If he doesn't know that such conditions exist today, discuss with him the typhoid outbreak near Miami, Florida, in 1973, which was the result of unsanitary sewage disposal. Also mention living conditions in slums the world over.

ES 01 Core 4

Lists conditions favorable to epidemics.

The student recalls that epidemics are fostered by a misuse of the environment.

Student Action: Listing the notion of at least two of the following misuses of the environment: (1) overcrowded living conditions, (2) unsanitary living conditions, (3) improper disposal of garbage, (4) improper disposal of sewage, and (5) infestation of rats and other vermin.

Performance Check A: List two or more conditions that would favor the spread of an epidemic across an entire city.

ES 01 Core

5

Remediation: (1) Check the student's answer to Self-Evaluation 1-6. (2) If the idea is not clear, discuss page 5 with your student. (3) If the student has not done Excursion 1-1, suggest that he do it. If he did the excursion, have him review it.

ES 01 Core 6

Selects the condition most likely to curb the spread of contagious diseases.

The student applies the concept of the conditions conducive to the spread of diseases.

Student Action: Selecting the course of action that involves eliminating overcrowded and unsanitary living conditions and stating as his reason the idea that diseases usually spread because of those conditions.

A: c
B: b
C: d

Performance Check A: A doctor has been hired to help the government of a heavily populated country. His job is to advise the government as to the fastest and most effective way to reduce the number of epidemics of serious diseases that sweep the country from time to time. The government can afford only one of the programs listed below.

a. Building new medical schools to train more doctors
b. Developing an improved transportation system so that doctors can travel more quickly
c. Building many low-cost government housing projects to eliminate overcrowded and unsanitary living conditions
d. Building new hospitals so that more sick people can receive treatment

1. Which one of the programs above do you think the doctor should recommend?
2. Explain your answer.

Remediation: (1) Have the student review the first paragraph at the top of page 5. (2) Have him do or review Excursion 1-1. (3) Be sure the student understands that everyone is a possible carrier of disease and that chances of becoming infected are greatest under poor living conditions. (4) Have him review the options in the check he did and identify each course of action as either helping people not to get sick or helping the sick to get well. (5) Check his answers to Self-Evaluations 1-5 and 1-6.

ES 01 Core

Defines the term *components*.

The student recalls the definition of the term *components* as it is used in the discussion of a system.

Student Action: Responding, in effect, that components are the things (objects or kinds of matter) that influence each other within a system.

Performance Check A: In a discussion of a system, what is meant by the term *component*?

7

Remediation: (1) Have the student review page 11 and the suggested response to Self-Evaluation 2-6. Be sure he understands that *things* in the definition means objects or things made of matter and does not include forms of energy. (2) Then have him name those things in Figure 2-2 which are components. (3) If a Level I text is available, have the student review pages 8 and 9.

Lists components of a given system.

The student applies the concept of components to a specific system.

Student Action: Listing three objects (or substances) that are part of the specified system and affect other parts.

Performance Check A: Consider a bicycle as a system. List three components of this system.

Remediation: (1) Check the student's answer to Self-Evaluation 2-6. (2) Have him review page 11. If he lists any nonfunctioning part, such as the seat of a bicycle, car, or truck, discuss the word *influence* in the definition of a system on the referenced page. (3) If ISCS Level I text and materials are available, refer the student to Activity 1-17 on pages 8 and 9.

ES 01 Core 8

Defines *system*.

The student recalls the definition of *system*.

Student Action: Stating, in effect, that a system is a set of objects that influence each other.

Performance Check A: Explain briefly what *system* means as the word is used in the following sentence. Automobiles, the human body, and an assembly line are examples of systems.

Remediation: (1) Check the student's response to Self-Evaluation 2-5. (2) Ask him to review the top paragraph on page 11. (3) If an ISCS Level I text is available, refer him to pages 8 and 9.

ES 01 Core 9

Lists the components of a specific system.

The student applies the concept that a component is any object in a system, including the matter input to and output from a specified component of the system.

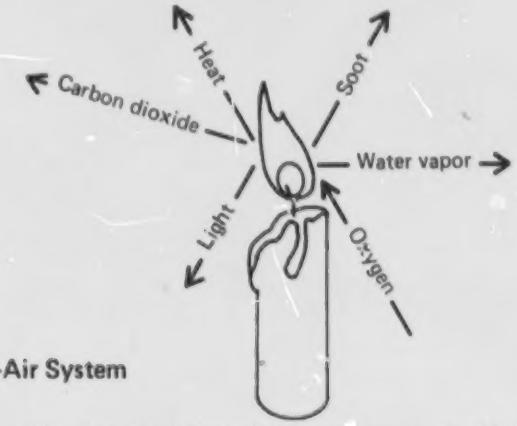
ES 01

Core 10

Student Action: Listing as three components any input or output which are matter or objects and are part of the system.

A: Oxygen, carbon dioxide, water vapor, soot
B: Food, oxygen, solid wastes, carbon dioxide
C: Food, oxygen, solid wastes, carbon dioxide

Performance Check A: The diagram below shows a candle-air system. List any three of the labels which identify components of this system.



Candle-Air System

Remediation: (1) Check the student's responses to Self-Evaluations 2-5 and 2-6. (2) Refer him to pages 11 and 12 of the text. (3) Check to see if he understands the word *thing* to mean matter or things made up of matter. Check to see that he understands that the size and scope of a system is a matter of definition by the observer. (4) If necessary, discuss together Figure 2-2, page 10. It is very important that he know exactly what a system is if he is to apply systems analysis to problems for which he must structure the method of attack. (5) If a Level I text is available, have the student review the last two paragraphs on page 8 and the first two paragraphs on page 9. (6) Encourage your students to look for systems and components as a way to attack and think about problems presented to them in Level III.

ES 01 Core 11

Explains why the output of organisms does not seem to accumulate.

The student applies the concept of systems.

Student Action: Stating that the output of an organism is usually the input for other organisms.

Performance Check A: All living things release output into their surroundings. If living things are constantly releasing output, explain why we do not often find the output piling up.

Remediation: (1) Check the student's answers to Self-Evaluations 2-7, 2-8, and 2-9. (2) Refer the student to Figures 2-4 through 2-7 on pages 11 through 14. If necessary, discuss these figures with the students.

Recognizes input and output of a component.

ES 01 Core 12

The student applies the concept of input and output of a component of a system.

Student Action: Selecting as the input to a component two things that the component removes from its surroundings and as the output of a component two things that it adds to its surroundings.

A: 1. b, d; 2. c, f
B: 1. a, d; 2. b, f
C: 1. a, c; 2. b, e

Performance Check A: An automobile engine can be thought of as one component of a system. The list below includes some things which are input and output of this component.

a. Light
b. Gasoline
c. Exhaust gases
d. Air
e. Time
f. Heat

1. Write the letters of two things which are input to an automobile engine.
2. Write the letters of two things which are output from an automobile engine.

Remediation: (1) Check the student's answers to Self-Evaluations 2-3 and 2-4. (2) Check the student's response to question 2-10 on page 11. (3) If necessary, discuss Figure 2-5 on page 12.

Defines the term *producer*.

ES 01 Core 13

The student recalls the biological definition of the term *producer*.

Student Action: Responding to the effect that a producer is an organism which is able to use energy directly from the sun to produce chemicals and thus store the energy in its body.

Performance Check A: What is meant by the term *producer* as it is used in the following sentence? An oak tree is a producer.

Remediation: (1) Check the student's answer to Self-Evaluation 2-13. (2) Refer the student to the last paragraph on page 17 for a definition. (3) Have him list four producers.

Defines *consumer* in the biological sense.

ES 01

The student recalls the definition that a consumer is an organism that cannot get energy directly from the sun.

Core 14

Student Action: Stating in effect that a consumer is an organism which cannot get the energy it needs directly from the sun but must get its energy either by eating plants or by eating animals.

Performance Check A: Organisms such as deer and wolves are called *consumers.* What is the meaning of the word *consumer* when it is used in this way?

Remediation: (1) Check the student's answer to Self-Evaluation 2-10. (2) Direct the student to read the first paragraph on page 18. (3) Have him classify each organism in Figure 2-12 as a consumer or nonconsumer. (4) Review his answer to Self-Evaluation 2-10.

ES 01 Core 15

Defines the biological meaning of *decomposer.*

The student recalls the definition of *decomposer.*

Student Action: Stating in effect that a decomposer is an organism which produces physical and chemical changes in the waste materials and the dead bodies of plants and animals and as a result these waste materials can be used by living plants.

Performance Check A: Some types of living things are known as *decomposers.* State what is meant by the term *decomposer.*

Remediation: (1) Check the student's answer to Self-Evaluation 2-10 for his identification of decomposers. (2) Have him review the paragraph following question 2-23 on page 18. (3) Check his response to question 3-26.

ES

Recognizes examples of producers, consumers, and decomposers.

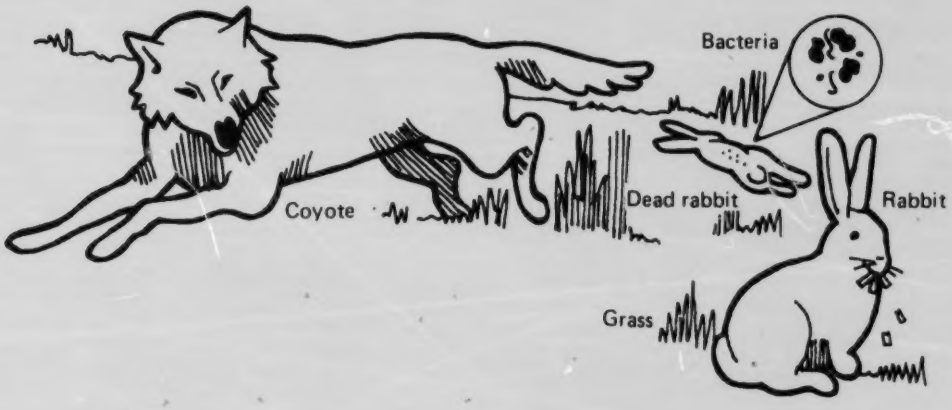
The student classifies living things as producers, consumers, and decomposers.

Student Action: Naming as a producer a living thing that can use energy directly from the sun and store it as chemical energy, as a consumer a living thing that depends on other living things for energy, and as a decomposer an organism that chemically changes waste materials and dead organisms into products that can be used by plants.

A: 1. producer, 2. decomposer, 3. consumer, 4. consumer
B: 1. producer, 2. consumer, 3. decomposer, 4. consumer
C: 1. consumer, 2. consumer, 3. producer, 4. decomposer

Performance Check A: Consider the environmental system pictured below. Identify each component in the following list as a producer, a consumer, or a decomposer.

1. Grass growing in a field
2. Bacteria, which feed on dead rabbits
3. Rabbits eating grass in the field
4. Coyotes, which roam the fields hunting for rabbits



Remediation: (1) Refer the student to the bottom paragraph on page 17 and all of page 18. (2) Have him identify the producers, consumers, and decomposers in Figure 2-12 in Excursion 2-2. (3) Check his answer to Self-Evaluation 2-10.

Explains why governments make laws against minor acts of pollution by individuals

The student applies the concept that whereas the effects of a single person's actions may be insignificant, the insignificant actions of many people when taken together may be disasterous to the environment.

01 Core 17

Student Action: Stating an explanation which includes the idea that the government passes laws to deter large numbers of people from performing individual actions which taken together would have a serious cumulative effect on the surroundings.

Performance Check A: Sometimes a person will throw a piece of paper out of a car window. A single sheet of paper does not affect the environment very much. However, the governments of all states have passed laws making it illegal to throw trash onto the side of the road. Why do governments pass laws that make a little thing like this illegal?

Remediation: (1) Check the student's answer to question 2-13 on page 13. (2) If necessary, discuss the paragraph following question 2-13 with him.

ES 01 Core 18

States whether an object influences its surroundings.

The student applies the concept of an object's influencing its surroundings.

Student Action: Responding negatively and in effect that the object influences its surroundings when it takes something from them, adds something to them, or just occupies space.

Performance Check A: Mr. Morgan is requesting permission to build a new factory in town. The plans call for a good waste-treatment process so that liquid wastes will not pollute nearby streams and for an air-cleaning process so there will be no smoke to pollute the air. In fact, Mr. Morgan made a statement to the press saying that the factory will be so well designed that it will not influence its surroundings at all.

1. Can Mr. Morgan's statement to the press be true?
2. Explain your answer.

Remediation: (1) Check the student's answers to Self-Evaluations 2-2 through 2-4. (2) Although these questions deal with a burning match, discuss their implications when generalized. (3) Have the student review pages 10 through 12.

ES 01 Core 19

Recognizes direct and indirect influences.

The student classifies an influence as direct or indirect.

Student Action: Writing the word *direct* for those influences in which one thing physically acts on the other and *indirect* for those influences produced through a change in the surroundings.

A: 1. indirect, 2. indirect, 3. indirect, 4. direct
B: 1. direct, 2. indirect, 3. direct, 4. direct
C: 1. indirect, 2. indirect, 3. direct, 4. direct

Performance Check A: In the four cases below, decide whether the influence on the underlined living organism is direct or indirect. After the number of each case, write either the word *direct* or the word *indirect*.

1. A city reduces the number of purple martins, which eat insects, by draining swamps to kill the mosquitoes and other insects.
2. A tree dies because a vine grows over it and blocks out the sunlight.
3. Trees die from lack of water because the area around them has been covered by concrete.
4. A farmer reduces the number of foxes on his farm by shooting them.

Remediation: (1) Check the student's answers to questions 2-16 and 2-17, page 16. (2) Discuss Figures 2-8 and 2-9 on page 15 with him. (3) If a specific example is necessary, check his answers to questions 2-18 and 2-19, page 16, and discuss Figure 2-10 and the paragraph preceding it.

ES 01 Core 20

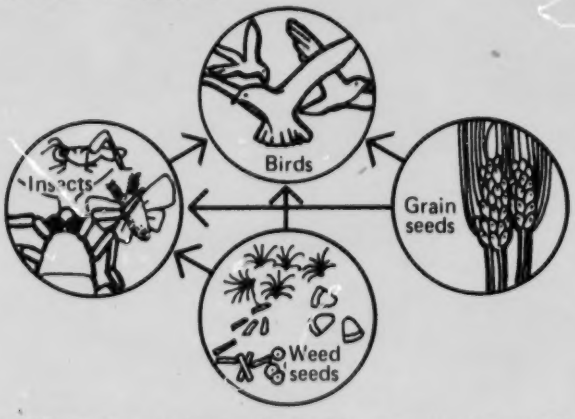
Predicts the results of change in a balanced system.

The student applies the concept that a change in one part of a balanced system may produce changes in another part of the system.

Student Action: Stating a prediction which implies the notion of the concept. The following answers are provided only as samples of possible answers. Accept any answer that includes the notion that a change in another part of the system will result from the change given.

- **A:** Weeds will increase or birds will eat more weeds or grain.
- **B:** Snakes will eat more birds or more seeds will grow.
- **C:** Insects will increase or insects will eat more grain and weeds.

Performance Check A: The diagram below shows the food flow through a balanced system on a farm. Predict what might happen if the farmer sprayed with insecticides and destroyed almost all the insects.



Remediation: (1) With the student, check his answers to questions 2-24 through 2-27. (2) Have him do or review Excursion 2-2. (3) Check his answer to Self-Evaluation 2-12.

ES 01 Core 21

Predicts the results of a change in environmental input-output.

The student applies the concept that if the environmental input-output balance of a subsystem is disturbed, the whole system can be drastically upset.

Student Action: Predicting at least two of the following: (1) damage to the food and water sources of fish, wildlife, and humans, (2) damage to the breeding grounds of fish and wildlife, and (3) loss of an area of natural beauty.

Performance Check A: A marshy area drains into the Everglades National Park. Plans are being made to fill in some of the marshy area and construct a large new airport. Give at least two ways in which the environment probably will be affected by pollution from the airport.

Remediation: (1) Check the student's answers to questions 2-25, 2-26, and 2-27 on page 19. (2) Check the student's answer to Self-Evaluation 2-12.

ES 01 Core 22

Explains how it is possible for people in industrial nations to affect their environment more than do people in nonindustrial nations.

The student generates an explanation for the fact that the average person in the United States affects his environment much more than does a person in a nonindustrial country.

Student Action: Stating an explanation based on the concepts that the input and output of all organisms affect their environments and that a person in an industrial nation has larger input from and output to his environment than does a person in a nonindustrial nation.

Performance Check A: Some scientists have told Congress that the average person in the United States has the same effect on the environment as 30 persons living in one of the nonindustrial nations of the world. Explain how this could be true.

Remediation: (1) Ask the student what might be different about an industrial and a nonindustrial country from the standpoint of what is consumed. Have him consider such input as metal for automobiles, gasoline, plastic food containers, heating oil and gas, and wood pulp. Have him consider such output as factory effluents, exhaust of fossil fuels, paper waste from packaging, and empty bottles. (2) If the idea of consumer differences between nonindustrial nations and the U.S. is not known to the student, direct him to seek help from a teacher of social sciences.

ES 01

Selects organisms which affect the environment.

The student applies the principle that an organism by its very existence affects its environment by taking things out of the environment and by adding other things to the environment.

Student Action: Selecting those items which show that the environment is affected.

A, B, and **C:** e

Core 23

Performance Check A: Select the best answer for the following question. Which of the following will affect the environment?

a. A secretary driving her car to work
b. A person pedaling his bicycle to the office
c. A tree growing in the forest
d. Plants in an aquarium kept by a tropical fish hobbiest in his living room
e. All of the above

Remediation: (1) Have the student review pages 14 through 18. (2) Have him review the suggested responses to Self-Evaluations 2-15 and 2-16. (3) Ask him to name one organism which does not affect its environment and to explain his answer.

Describes the input and output of gases in an atmosphere containing different kinds of living things.

ES 01 Core 24

The student applies the concept of the exchange of gases among living things and the surrounding atmosphere.

Student Action: Stating, in effect, that green plants take carbon dioxide and some oxygen from the air and release a large amount of oxygen into the air, whereas animals take oxygen from the air and, primarily, release carbon dioxide into it.

Performance Check A: Describe the input and output of gases of the system formed by living things and the atmosphere that surrounds them in the following situation. Clover grows in a field in which a herd of goats graze.

Remediation: (1) Review with the student his response to question 2-10. If necessary, have him review pages 16 and 17 to correct his response to the question. (2) Check his responses to Self-Evaluations 2-11, 2-14, 2-15, and 2-16. If his responses are wrong or if his responses to 2-15 and 2-16 don't include the transfer of gases, discuss the concept with him.

ES 01 Core 25

Lists input to and output from the human body.

The student applies the concepts of input to and output from the human body.

Student Action: Listing as output three of the following: urine, solid waste, carbon dioxide, and heat, and as input, two of the following: oxygen, food, and water.

Performance Check A: List two things which are input to and three things which are output from the human body.

Remediation: (1) Refer the student to page 13. Check his answer to question 2-12. (2) Have him read page 15 and list three animals which man kills for food and two he kills for furs. (3) Have him read page 17 and list four green plants which are killed for human food and two killed for other human needs. (4) Ask him to list the human waste products. Students may be squeamish about naming urine and solid wastes, but such things are facts of life and should be treated matter-of-factly. If a student knows only euphemisms or obscenities and has no language which he feels is appropriate to use in an answer, help him build his vocabulary. (5) Check the student's answers to Self-Evaluations 2-7, 2-8, and 2-9 on pages 41 and 42.

ES 01 Core 26

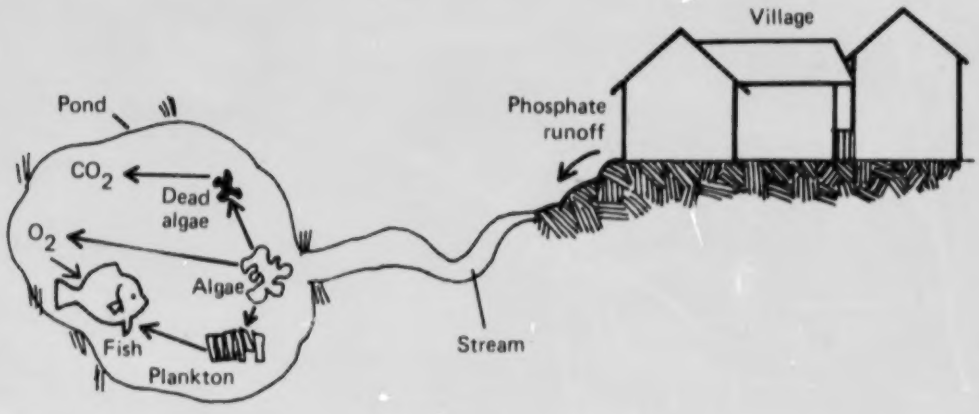
Describes the result of upsetting the balance of a system.

The student applies the concept of the effect of changing a component of a system which is in balance.

Student Action: Responding with the notion that any upset in a balanced system may produce changes in the other components of the system.

Performance Check A: The system pictured below is in balance.

1. What is likely to happen to the fish in the pond when the housewives in the village on the hill switch from soap to a phosphate detergent?
2. Explain your answer.



Remediation: (1) Check the student's answers to questions 2-24 through 2-27 on pages 18 and 19. (2) Check his answers to Self-Evaluations 2-11 and 2-12. (3) If necessary, discuss Figure 2-3 of Self-Evaluation 2.

Cleans up the work area at the close of class.

ES 01 Core 27

The student chooses to close the laboratory activity period promptly upon receiving notification of the time to do so.

Student Action: Ceasing the ongoing laboratory activity when notified of the time, returning materials in usable, clean condition to storage, and participating in work area cleanup, on at least three separate occasions when being observed by the teacher without his knowledge.

Teacher's Note: The opportunity for assessment of this objective arises almost every day during the course of regularly assigned laboratory activities. Use a few minutes of class time for group instruction early in the school year, and almost every week for reinforcement, to discuss the role of the student in the ISCS learning environment. To encourage personal responsibility in the student, discuss the reasons for his closing his activities promptly (to allow time for himself and others for lab-closing activities), returning materials to storage in clean condition (to facilitate their use by others), and participating in area cleanups (to leave the area as clean as he found it).

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) If a student fails to accept this responsibility, approach him individually and review the reasons for his acceptance of it. Emphasize the social responsibility for cooperation in the learning environment for the good of all students. Point out that he has received the benefit of other students' provisions for others as well as for themselves. (2) Do not, at first, suggest that he may lose his privileges unless he cooperates. But if he doesn't cooperate after you observe his behavior several times, ask him if he can suggest a proper penalty. (3) An alternative remedy may be to request him to assist in the process of overall classroom accounting of the materials for a period of time until he recognizes the importance of the student's role. (4) Do not use extra cleanup as a penalty for not cleaning up properly. In other words, don't use something as a penalty that you want done willingly.

Cooperates with lab partners.

ES 01 Core

The student chooses to cooperate with fellow students in the laboratory.

Student Action: Being polite, waiting his turn, being orderly when moving about, and observing the right of his classmates to work without being unnecessarily disturbed, when observed without his knowledge by the teacher or another designated person on at least three occasions.

28

Teacher's Note: The opportunity for assessment of this objective arises almost every day during the course of regularly assigned laboratory activities. Use a few minutes of class time at the beginning of a session for a whole-group discussion early in the school year and several times later on to discuss the need for cooperation with and consideration of other students. Some particular points for discussion include being polite, waiting patiently, not making others wait longer than necessary, being orderly when moving about, and observing the right of others not to be disturbed. Talk about each student's accepting the personal responsibility for his own behavior in the group situation.

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) If a student fails to accept any of these responsibilities, approach him privately and review the reasons for his lack of cooperation with his fellow students. Suggest that he pay some attention to changing his behavior to more acceptable standards. (2) Find out if the student feels that he is behaving in a less than acceptable way. If so, ask him whether he feels some penalty should be imposed and what he thinks a suitable penalty would be.

ES
01
Core
29

Returns equipment promptly to storage areas.

The student chooses to show personal responsibility for returning laboratory equipment promptly to the proper storage places as soon as it is no longer needed, during the class period, and not just as the end of the period.

Student Action: Returning equipment and materials no longer needed to the proper storage places on at least three occasions when observed by the teacher or another designated observer without his knowledge of being checked.

Teacher's Note: This objective may be assessed at any time the student is responsible for learning activities requiring the use of equipment and supplies. Use a few minutes of class time for group discussion of the reasons for returning equipment to storage areas promptly when it is not being used by the student or by his group. The reasons include (1) the short supply of certain items and the need to cooperate with others, (2) the chances of equipment's being misplaced, (3) the possibility of accidental damage to equipment, and (4) the greater opportunity for pilferage by an irresponsible student when things are disorganized.

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: In a private conference, discuss the reasons for the student's cooperation in this request. Ask for that cooperation. See also Remediations (1), (2), and (3) for 01-Core-27.

ES

Responds to text questions.

The student chooses to write in his *Record Book* the answers to 90% or more of the textbook questions.

Student Action: Exhibiting the written responses when requested to do so. At least nine out of ten questions should have responses, be they correct or incorrect.

01 Core 30

Teacher's Note: It is intended that this objective be assessed throughout the year. Such a check provides opportunities to encourage students to work nearer their capacities while remaining independent of the teacher. Use a few minutes of class time for a group discussion of the reasons for writing the answers in the *Record Book*. Writing in the *Record Book* serves (1) to help the student think through what he sees and does, (2) to preserve ideas for future reference, (3) to make a record of the student's progress through the core, (4) to provide the teacher with a source of input for analyzing the student's difficulties and progress, and (5) to help the student learn the background ideas for conceptual understanding. Writing in the *Record Book* is "in"; writing in the text is "out."

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) In a private conference, discuss with the student the ideas enumerated and ask why he chooses not to write the answers. (Perhaps he cannot write!) Evaluate his reasons and counsel him accordingly. Encourage him to follow the pattern of his classmates and set down his ideas as they are doing. (2) Have him read "Notes to the Student," pages viii and ix in his text. (3) Follow up in a few days to determine his actions.

Shows care for laboratory materials.

ES 01 Core 31

The student chooses to show proper care and use of ISCS laboratory materials.

Student Action: Using the materials only for their intended purpose or requesting permission to do other specific experiments with them, when being observed without his knowledge by the teacher or another designated person on three or more occasions.

Teacher's Note: This objective may be assessed at any time that the student is responsible for a learning activity in which equipment and supplies are required. Use a few minutes of class time for a whole-group discussion of the reasons for handling laboratory materials properly. Such reasons include: (1) If damaged, they are lost to use by students who need them now. Short supply means waiting in line. (2) They cannot readily be replaced. Replacement usually takes several months at best. (3) If materials are handled properly, they may be used for other than regular activities (with the permission of the teacher and after making a proper request).

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) In a private conference, ask the student why he chooses to mishandle equipment. Help him to evaluate his reasons, and ask for his cooperation in the future. If he agrees, reassess the objective later. (2) If after the conference he still does not agree, ask him if he feels that he should be penalized and what he thinks should be an appropriate penalty. Give him another opportunity for compliance. (3) If he is still uncooperative, apply a penalty for mishandling equipment. This may mean denying him use of the equipment either temporarily or permanently or taking some other suitable action.

ES 01 Exc 1-1 1

Plots data and draws a line of best fit.

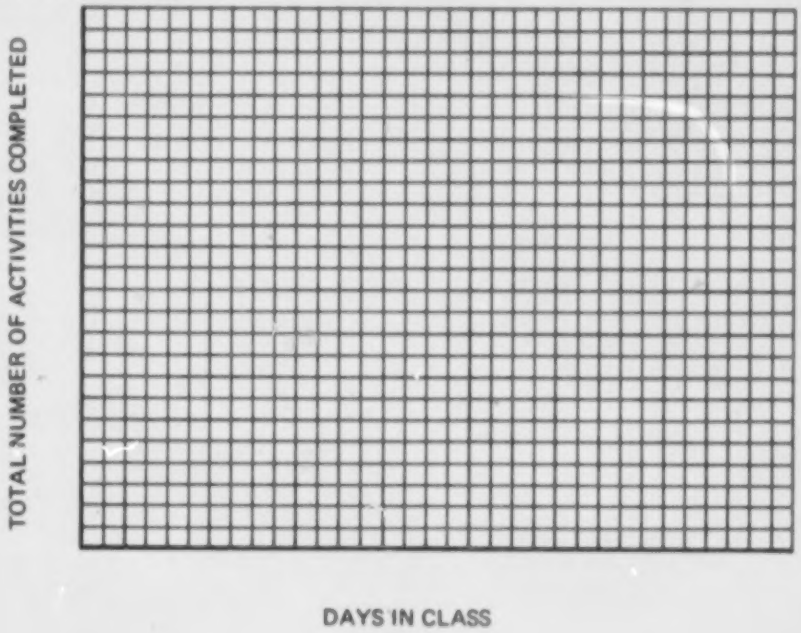
The student applies the procedures for graphing.

Special Preparations: Have grid paper ready for the student or duplicate the partially labeled grid found at the end of this book.

Student Action: Constructing a graph following the procedure that includes (1) numbering the axes so that each interval represents the same change in the variable and so that the range of the data includes at least one-half of the scale, (2) plotting the data points to within ±0.2 major scale units, and (3) drawing the line of best fit as a smooth curve.

Performance Check A: The following table lists the total number of ISCS activities completed by a student during the first thirty days of classes. Get a partially labeled grid or an unlabeled grid from your teacher. If the grid is unlabeled, draw and label the axes as shown on the grid below. Put a suitable scale on each axis. Then plot the data, and draw the line of best fit.

DAYS IN CLASS	TOTAL NUMBER OF ACTIVITIES COMPLETED
0	0
5	9
10	14
15	18
20	22
25	24
30	27



Remediation: (1) Check the student's answer to question 1-1 on page 4. (2) If the student has done Excursion 1-1, check his graphing of the information in Table 1 on page 96. If he has not done the excursion, encourage him to do so. (3) If graphing is a problem and ISCS Levels I or II texts are available, suggest that the student review Excursion 5 in Level I or Excursion 7-1, Part A, in Level II.

ES 01 Exc 2-1 1

Judges whether a particular chemical reaction is possible.

The student applies the rule that in ordinary reactions, elements in the products are not different from those in the reactants.

Student Action: Responding negatively and to the effect that the reaction could not occur because there are elements in the products that are different from those in the reactants.

Performance Check A:

1. Is it possible for the following reaction to occur?

$$Pb(NO_3)_2 + 2KI \rightarrow PbCl_2 + 2NaNO_3$$

(lead nitrate) (potassium iodide) (lead chloride) (sodium nitrate)

2. Explain your answer.

Remediation: (1) Refer the student to the two paragraphs following Figure 4 on page 102. (2) If additional explanation is necessary, discuss Figures 1 through 4 on pages 101 and 102.

ES 01 Exc 2-1 2

Selects examples of parts of the ISCS particle model.

The student classifies elements, reactants, products, and compounds.

Student Action: Selecting at least one part of the equation as representing each of the following: (1) an element (made up of only one kind of atom), (2) a compound (made up of more than one kind of atom), (3) a reactant (starting substance in a chemical reaction), and (4) a product (new substance formed in a chemical reaction).

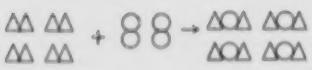
A: 1. ΔΔ or 8
2. ΔΔ or 8
3. ΔOΔ
4. ΔOΔ

B: 1. □ or ΔΔ
2. ΔO or □□O
3. □ or ΔO
4. □□O or ΔΔ

C: 1. OΔOΔ
2. OΔO or ΔΔ
3. ΔΔ
4. ΔOΔO or ΔOΔ

Multiple representations in any of the four answers in each check are acceptable.

Performance Check A:



In the equation pictured above, assume that the symbols Δ and ○ represent different kinds of atoms. After the number of each term below, draw on your answer sheet the symbol or symbols taken from the equation above which illustrate the term.

1. Element
2. Reactant
3. Product
4. Compound

Remediation: (1) Have the student review parts 3 and 6 from the description of the particle model on pages 99 and 100. (2) Then have him review pages 101 through 103. (3) Ask him to explain the labels in Figures 3 and 4 on page 102, to identify the products in Figure 4 as either elements or compounds, and to explain his labels. (4) Then have him do an alternate check.

ES 01 Exc 2-1 3

Recognizes methods for increasing the rate of a reaction.

The student applies the concept of methods for increasing the rate of a reaction.

Student Action: Selecting the one option which does not include one of the following methods for increasing the rate of a chemical reaction: (1) increasing the temperature, (2) increasing the concentration of one or more reactants, and (3) adding a catalyst.

A: c
B: a
C: d

Performance Check A: Beverly is producing some carbon dioxide gas. The chemical reaction that she is using to produce the gas is

$$\underset{\text{(calcium carbonate)}}{CaCO_3} + \underset{\text{(hydrochloric acid)}}{2HCl} \rightarrow \underset{\text{(calcium chloride)}}{CaCl_2} + \underset{\text{(water)}}{H_2O} + \underset{\text{(carbon dioxide)}}{CO_2}$$

Which of the following actions would not increase the rate at which carbon dioxide is produced?

a. Increasing the concentration of HCl
b. Heating the substances that are reacting
c. Decreasing the concentration of $CaCO_3$
d. Adding a catalyst

Remediation: (1) Have the student read the paragraphs below Figure 7 on page 104. (2) If the materials are available to you, have the student mix the chemicals as described below and compare the rates of the two reactions.

Reaction 1: 5 ml HCl + 10 ml H_2O + 4 pieces of shell

Reaction 2: 1 ml HCl + 14 ml H_2O + 4 pieces of shell

Have him state whether or not concentration made a difference. (3) Also have him mix the chemicals as described below and compare the reactions to see the effect of heat.

Reaction 1: 2 ml HCl (3M) + 15 ml H_2O + heat for 3 min + 4 pieces of shell

Reaction 2: 2 ml HCl (3M) + 15 ml H_2O + no heat + 4 pieces of shell

---

ES 01 Exc 2-1 4

Explains why a substance must be heated before it will burn in air.

The student applies the concept that energy is required to start a burning reaction.

Student Action: Stating in effect that energy is often required in order to break up combinations of atoms so that a chemical change can occur.

Performance Check A: Paper reacts with the oxygen in the air in a process that is usually called *burning*. However, before the burning starts, the paper must be heated. Explain why this heat energy is needed to start the burning process.

Remediation: (1) Have the student review the last paragraph on page 102 and all of page 103. (2) If necessary, discuss Figure 6 on page 103.

ES 01 Exc 2-1 5

Matches terms from the ISCS particle model with their definitions.

The student recalls the definitions of *element, compound, product, reactant, ion,* and *molecule.*

Student Action: Matching *element* with a "substance containing only one kind of atom," *compound* with "a substance containing two or more different kinds of atoms," *product* with "a new substance produced in a chemical reaction," *reactant* with "a starting substance in a chemical reaction," *ion* with "a particle with either excess positive charge or excess negative charge," and *molecule* with "a particle that contains equal numbers of positive and negative charges."

A: 1. b, 2. e, 3. c, 4. a, 5. d, 6. f
B: 1. d, 2. c, 3. b, 4. f, 5. a, 6. e
C: 1. e, 2. b, 3. a, 4. d, 5. f, 6. c

Performance Check A: Match the letter of each definition below with the number of the term from the ISCS particle model to which it applies.

Terms	Definitions
1. Element	a. A starting substance in a chemical reaction
2. Compound	b. A substance containing only one kind of atom
3. Product	c. A new substance produced in a chemical reaction
4. Reactant	d. A particle with either excess positive charge or excess negative charge
5. Ion	e. A substance containing two or more different kinds of atoms
6. Molecule	f. A particle that contains equal numbers of positive and negative charges

Remediation: (1) Have the student review items 3, 6, and 7 from the particle model on pages 99 and 100 and the paragraph below the figures on page 102. (2) Have him explain why the labels in Figures 1 through 4, pages 101 and 102, are appropriate.

ES 01 Exc 2-1 6

Selects the relationship between temperature change and energy in a reaction.

The student applies the concepts of the relationship between temperature change and energy.

Student Action: Selecting the statement which agrees with the data supplied and with the concepts that if the temperature rises, the energy released is greater than the energy required, if the temperature is constant, the energies are equal, and if the temperature decreases, the energy released is less than the energy needed.

A: b
B: c
C: a

Performance Check A: Ernest measured the temperature of two solutions, A and B. He then mixed the two solutions and measured the temperature again.

SOLUTION	TEMPERATURE (in °C)
A	18
B	19
A + B	24

Select the statement below that best describes the relationship between the energy needed to separate the reactant particles and the energy released when those particles recombine to form products in the chemical reaction.

a. The heat needed to separate the reactant particles is greater than the heat released when those particles recombine to form products.
b. The heat needed to separate the reactant particles is less than the heat released when those particles recombine to form products.
c. The heat needed to separate the reactant particles is equal to the heat released when those particles recombine to form products.
d. From the information given, you cannot tell which energy is greater.

Remediation: (1) Have the student review pages 103 and 104. (2) Ask him if the energy needed to break apart reactant atoms in a match is less than or greater than the energy released when the atoms recombine with air. Ask him to cite evidence. (Since the reaction gives off heat, the energy required to break down the reactants is less than the energy released in the formation of the product.)

ES 01 Exc 2-2 1

Lists important considerations when eliminating a pest species.

The student recalls the criteria one should consider before deciding to eradicate a species from an area.

Student Action: Responding with the effect of at least two of the following: (1) knowing how much damage the species causes, (2) knowing the dollars and cents cost of an eradication program, (3) knowing the input and output of the species so that an estimate can be made of the possible effect of its eradication on other forms of life, (4) knowing whether the species exists elsewhere, and (5) knowing whether the species is an endangered species.

Performance Check A: Men in a gun club have spoken with a legislator about wolves. The men claim the wolves are killing off the deer population in the area and reducing their hunting. They want a bounty on wolves to encourage people to shoot them. Their argument is that the wolves don't do anyone any good and that killing them would provide better deer hunting. What information should the legislator try to get to help him make a decision?

Remediation: (1) Check the student's answers to questions 7 and 8 on page 108. (2) Ask him to imagine that the insects shown in Figure 2-12 were removed so that the fishermen would not be bothered by them while they fish and then to describe the effects of their eradication. (3) Review his responses to questions 2-25 through 2-27 in terms of Figure 2-12.

ES 02

Chapters 3 thru 5 — **Performance Check**

Excursions 3-1 and 4-1 — **Summary Table**

Objective Number	Objective Description
ES-02-Core-1	Defines *biochemical oxygen demand*
ES-02-Core-2	Selects the graph which shows the oxygen demand in a population of microorganisms
ES-02-Core-3	Designs an activity, using a control and holding all but one variable constant
ES-02-Core-4	Selects a graph of oxygen demand versus time
ES-02-Core-5	Predicts a microorganism population from the initial population and its doubling time
ES-02-Core-6	Selects the best graph of population growth versus time
ES-02-Core-7	Recognizes the relationship between sewage and [illegible]n population
ES-02-Core-8	Explains a cause of the oxygen death of a body of water
ES-02-Core-9	Decides whether or not killing the decomposers in polluted water is a good idea
ES-02-Core-10	Explains why the fish population decreases downstream from a sewerage outlet
ES-02-Core-11	Explains why older water purification methods are no longer good enough
ES-02-Core-12	Recognizes the effects of detergent water on newly planted seeds
ES-02-Core-13	Selects the best prediction of the results of a second activity using related organisms
ES-02-Core-14	Describes how to determine if a certain insecticide affects germination
ES-02-Core-15	Defines *biodegradable*
ES-02-Core-16	Explains how biodegradable chemicals cause a rapid decrease of dissolved oxygen in lakes
ES-02-Core-17	States how biodegradable substances may cause pollution
ES-02-Core-18	Recognizes the effects of pesticides on the environment

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						√				recalls	
				Q						applies	
					T					generates	
				Q						recalls	
				Q			√			applies	
				Q		√				applies	
				Q					√	applies	
										recalls	
									√	applies	
					T				√	generates	
					T				√	applies	
						√				recalls	
				Q						applies	
						√				generates	
						√				recalls	
						√				applies	
				Q		√				applies	
						√				applies	

ES 02

Objective Number	Objective Description
ES-02-Core-19	Names and explains a system of organisms in which some are input for others
ES-02-Core-20	Explains the disappearance of some nonbiodegradable chemicals from rivers
ES-02-Core-21	Locates the extremes of concentrations of a nonbiodegradable chemical in a food chain
ES-02-Core-22	Names characteristics of an ideal detergent
ES-02-Core-23	Defends or modifies his response to a problem break in Chapter 4
ES-02-Core-24	States the effect of temperature on the rate of a chemical reaction
ES-02-Core-25	Interprets temperature data to indicate warm-blooded and cold-blooded animals
ES-02-Core-26	Relates changes in the activity of a cold-blooded animal to temperature
ES-02-Core-27	Defines *thermal death point*
ES-02-Core-28	Explains the death of fish put into a hot environment
ES-02-Core-29	Relates thermal death point and preferred temperature range
ES-02-Core-30	Explains why nonbiodegradable substances do not affect all species equally
ES-02-Core-31	Recognizes why fish select various areas of a body of water
ES-02-Core-32	Predicts the temperature favored by fish which need high concentrations of dissolved oxygen
ES-02-Core-33	Selects the graph which shows the effect of temperature on gas solubility
ES-02-Core-34	States at which of two temperatures fish will survive longer
ES-02-Core-35	Selects a graph showing the relationship between oxygen consumption and temperature

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						✓				recalls	
										applies	
						✓				applies	
					T				✓	generates	
										generates	
						✓				applies	
				Q		✓				classifies	
					T				✓	generates	
						✓				recalls	
						✓				applies	
										applies	
									✓	generates	
				Q						applies	
						✓				applies	
				Q			✓			applies	
										applies	
				Q			✓			applies	

ES 02

Objective Number	Objective Description
ES-02-Core-36	Defines *thermal pollution*
ES-02-Core-37	Selects the statement of an effect that is not a result of thermal pollution
ES-02-Core-38	Recognizes the possible results of short-term pollution
ES-02-Exc 3-1-1	Lists factors that affect the type of vegetation in an area
ES-02-Exc 3-1-2	Explains why disputes about water rights are increasing
ES-02-Exc 3-1-3	Recommends the vegetation for an area with little water
ES-02-Exc 3-1-4	Orders events of the water cycle
ES-02-Exc 4-1-1	Defines *plant growth* operationally
ES-02-Exc 4-1-2	Describes an experiment in which the appropriate variables are held constant
ES-01-Core-8R	Lists components of a given system
ES-01-Core-9R	Defines *system*
ES-01-Core-16R	Recognizes examples of producers, consumers, and decomposers
ES-01-Core-19R	Recognizes direct and indirect influences
ES-01-Core-20R	Predicts the results of change in a balanced system
ES-01-Exc 1-1-1R	Plots data and draws a line of best fit
ES-01-Exc 2-1-3R	Recognizes methods for increasing the rate of a reaction

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						✓				recalls	
				Q				✓	✓	recalls	
					T				✓	applies	
									✓	recalls	
									✓	applies	
								✓	✓	generates	
				Q						applies	
						✓				applies	
								✓	✓	generates	
						✓				applies	
						✓				recalls	
				Q		✓				classifies	
				Q		✓				classifies	
						✓				applies	
			P			✓				applies	
				Q		✓				applies	

ES O2 Core 1

Defines *biochemical oxygen demand.*

The student recalls the definition of the term *biochemical oxygen demand* (B.O.D.).

Student Action: Stating in effect that the B.O.D. is the need for oxygen by living things.

Performance Check A: What is meant by the term *biochemical oxygen demand*?

Remediation: (1) Have the student review page 22. (2) Check the student's responses to Self-Evaluations 3-2 and 3-6.

ES O2 Core 2

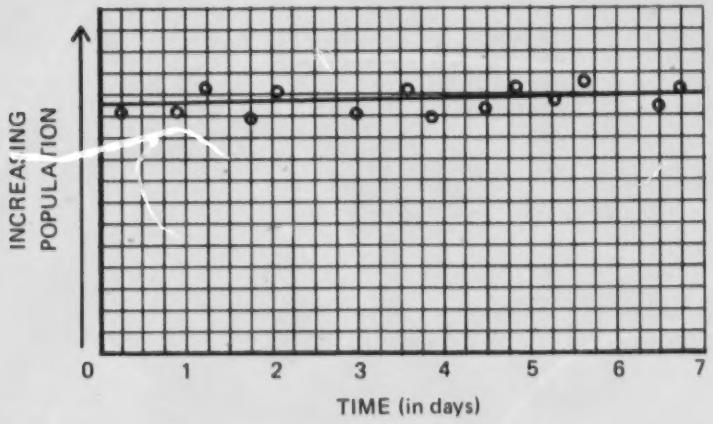
Selects the graph which shows the oxygen demand in a population of microorganisms.

The student applies the concept that the oxygen demand of a population of microorganisms is directly proportional to the size of the population.

Student Action: Selecting the graph with the same slope as the population-versus-time curve.

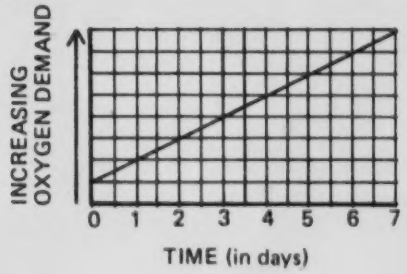
A: b
B: d
C: a

Performance Check A: Victor measured the number of microorganisms in an aquarium twice each day for a week. A graph of his data is shown below.

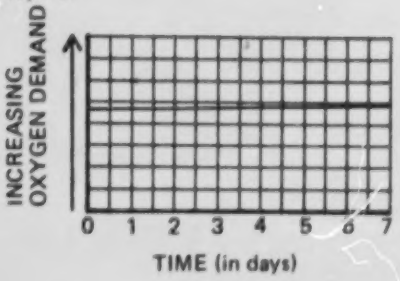


Which of the graphs below best shows the oxygen demand of this population of microorganisms?

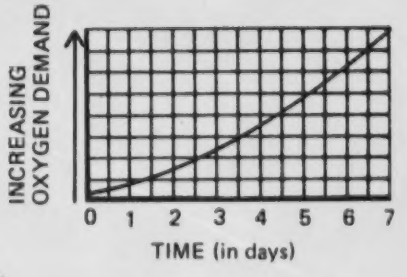
Graph a.



Graph b.



Graph c.



Graph d.

Remediation: (1) Check the answer to question 3-22 on page 28. (2) Review the student's findings for Problem Break 3-1 with him. (3) Have him review the text between Problem Breaks 3-1 and 3-2. (4) Have him correct his response to the check he did and do an alternate check as well. (5) Check his answer to Self-Evaluation 3-7. (6) If the concept of B.O.D. is a problem, check his answer to Self-Evaluation 3-2. (7) See the Remediation for 02-Core-6, part (4).

Designs an activity, using a control and holding all but one variable constant.

The student generates a description of an activity that includes holding all but one variable constant and involves a control.

Student Action: Describing an activity that includes a control sample and varies only the quantity of yeast added while the other variables are held constant.

ES
O2

Core 3

Performance Check A: Joe and Bill measured the time it took for the blue color to disappear from test tubes containing yeast and milk. Joe claimed that it was the action of the yeast on the milk that caused the color change. Bill said it had nothing to do with the yeast, that the milk itself had caused the color change. Describe an activity you could do to determine which boy is correct.

Remediation: (1) Check the student's experimental design in Problem Break 3-1 on page 28. (2) If the notion of a control sample presents a problem and a Level II text is available, have the student review pages 389 and 390 and then as a check do the Checkup on page 47 of that text. (3) Have the student explain why the two petri dishes marked C in Activities 4-2 and 4-3 of *Environmental Science* are called *controls*.

ES O2 Core 4

Selects a graph of oxygen demand versus time.

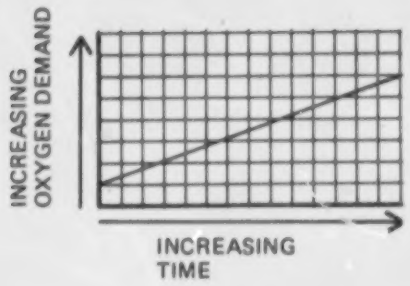
The student recalls that when an excess amount of food is made available to an organism, the oxygen demand increases slowly at first but then rises more and more rapidly.

Student Action: Selecting the graph that shows the oxygen demand of a population of microorganisms rising, slowly at first but with increasing rapidity with an unlimited food supply.

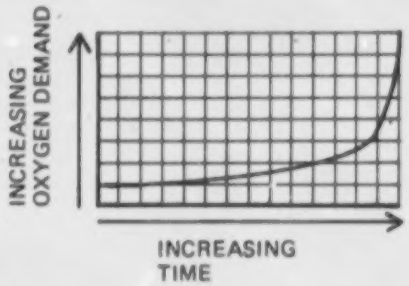
A: b
B: c
C: d

Performance Check A: Select the graph that best shows how the oxygen demand of a population of microorganisms changes with an unlimited food supply.

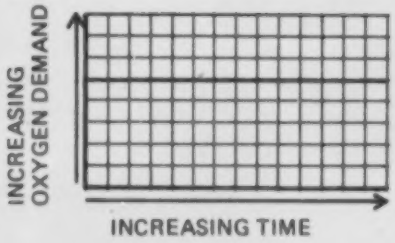
Graph a.



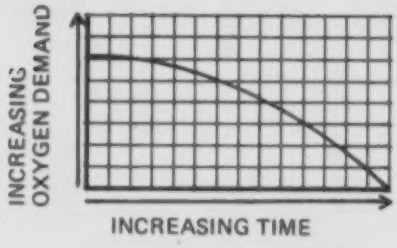
Graph b.



Graph c.



Graph d.



Remediation: (1) Review the student's calculations and responses to questions 3-19 through 3-22 including the graph he drew on Figure 3-3. (2) Review the results of Problem Break 3-1. (3) Have the student look at Figure 3-2, page 27, and read pages 28 and 29. (4) If ISCS textbooks are available, direct the student to Excursions 17 and 18 in the Level I text or Part B of Excursion 7-1 in Level II. (5) If the ISCS texts are not available, discuss graphing with the student. If possible, have another student help him with graphing and its interpretation.

Predicts a microorganism population from the initial population and its doubling time.

ES O2 Core 5

The student applies the concept that the size of a population of organisms doubles after each unit of time equal to the doubling time for that organism, provided unlimited food is present.

Student Action: Stating the final population size as found by successive "doublings" or by multiplying 2^n by initial population size, where n equals the integral multiple of the doubling time.

A. 640
B: 320
C: 512

Performance Check A: Martha put 10 yeast organisms into a large glass of warm milk. Under those conditions, it takes 30 minutes for each yeast organism to divide in two and become two yeast organisms. Predict the number of yeast organisms that will be in her glass 3 hours later.

Remediation: (1) Check the student's answers to questions 3-19 and 3-20, page 27, and to Self-Evaluation 3-8. The suggested answer to Self-Evaluation 3-8 illustrates the method of successive "doubling." Have him explain how he got his answers. (2) Have him redo the check. If his error was only arithmetical, have him go on. If he fails to understand the procedure, do step 3. (3) Help the student determine the size of the population at the end of each time interval until he arrives at the population size at the end of the stated time. (4) Then have him do an alternate check.

ES O2 Core 6

Selects the best graph of population growth versus time.

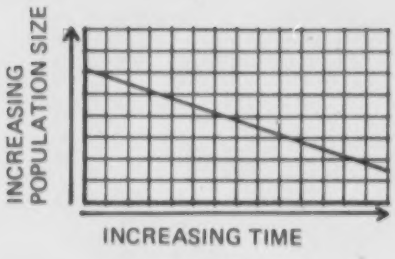
The student applies the concept that in the presence of an unlimited food supply, the size of a population grows slowly at first and then more and more rapidly (exponentially increasing) in the presence of unlimited food.

Student Action: Selecting the graph that shows an increase with time and is concave upwards.

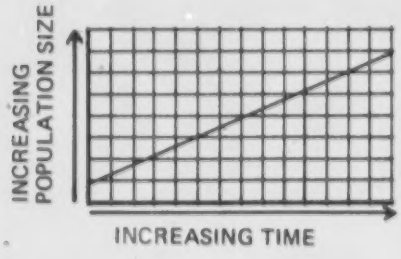
A: c
B: a
C: b

Performance Check A: Milo has put a few microorganisms into a gallon of milk. There is enough milk and oxygen available to support a very large population of the microorganisms. Select the graph below that best shows how the size of the microorganism population will change over the next few hours.

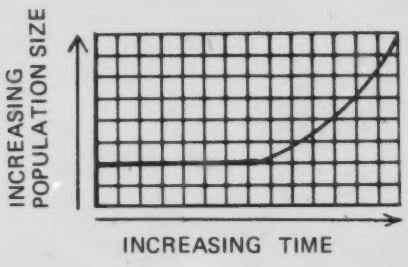
Graph a.



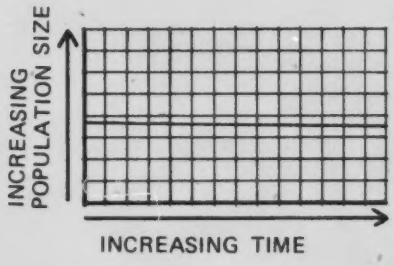
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answer to question 3-21. (2) If he has a problem with graph interpretation and if ISCS Levels I and II texts are available, refer the student to Excursions 17 and 18 in Level I or to Excursion 7-1, Part B, in Level II.

ES
O2
Core
7

Recognizes the relationship between sewage and fish populations.

The student applies the concept that many of the microorganisms which decompose sewage in a body of water use oxygen from the water.

Student Action: Selecting the statement that "the water contains too little oxygen."

A: d
B: b
C: c

Performance Check A: Crystal Lake is surrounded by cottages each of which has a sewerage line which extends into the lake. One summer, the residents noticed that certain kinds of fish no longer lived in Crystal Lake. The most probable reason is that

a. the sewage poisoned the fish.
b. the water stinks too much.
c. the fish became diseased from the sewage.
d. the water contains too little oxygen.

Remediation: (1) Have the student review Figure 3-2 and the paragraph at the top of page 27. (2) Then check the student's answer to Self-Evaluation 3-6. (3) If necessary, review with him the activities involving yeast and milk on pages 23 through 26 and then work through the sequence of questions 3-14 through 3-18.

ES O2 Core 8

Explains a cause of the oxygen death of a body of water.

The student recalls a cause of the oxygen death of a stream or a lake.

Student Action: Stating in effect either that oxygen death is caused by an increase in water temperature or that it is caused by microorganisms using up most or all of the dissolved oxygen as they decompose biodegradable material which has been dumped into the stream.

Performance Check A: What is a cause of the oxygen death of a lake or stream?

Remediation: (1) Check the student's answer to Self-Evaluation 3-6. (2) Have him review Problem Breaks 3-1 and 3-2 on pages 28 and 29.

ES O2 Core 9

Decides whether or not killing the decomposers in polluted water is a good idea.

The student applies the concept that decomposers are necessary components of an environmental system involving biodegradable wastes.

Student Action: Responding negatively and, in effect, that sewage will be left and that the best solution is to stop the pollution itself.

Performance Check A: Sewage has been flowing into Dead Lake. It is now filled with many decomposers. A civic group says that the decomposers have caused the lake to die. The group wants to spray the lake to get rid of all the decomposers.

1. Is this a good solution to the problem?
2. If so, explain why it is good. If not, suggest a better solution and explain why it is better.

Remediation: (1) Check the student's answer to Self-Evaluation 3-7. (2) Refer him to Figure 3-4 on page 29 and to the two paragraphs preceding it. (3) If necessary, discuss Figure 3-4 with your student.

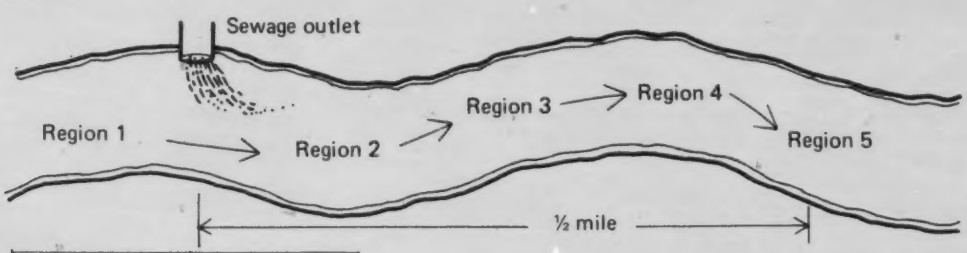
ES O2 Core 10

Explains why the fish population decreases downstream from a sewerage outlet.

The student generates an explanation for the progressive downstream decrease in a fish population based on the oxygen content of the water at various points downstream from a raw sewerage outlet.

Student Action: Stating an explanation to the effect that the microorganisms which are decomposing the sewage are using up the oxygen from the water as it flows downstream and that the progressive downstream reduction in the oxygen content causes the changes in the fish population.

Performance Check A: Monica did a survey of the number of fish living in various parts of a slow-moving stream near her house. She drew the diagram and table shown below.



REGION OF STREAM	NUMBER OF FISH
1	many fish
2	many fish
3	some fish
4	few fish
5	no fish

Use what you have learned about the needs of fish and the decomposition of sewage to explain Monica's observations.

Remediation: (1) Have the student study Figure 5-2, page 56, noting the effects of sewage on oxygen supply. Have him state why the oxygen drop is gradual, whereas the increase in sewage (and B.O.D.) is very rapid. (See his response to question 4 of Problem Break 5-2.) (2) Ask the student to look at the stream shown in the check and tell you at what point the microorganisms that decompose the sewage use up enough of the oxygen to affect the fish and then to explain the delay. His response should include the notion that decomposition and the use of oxygen varies with time.

Explains why older water purification methods are no longer good enough.

The student applies the fact of the increased difficulty of removing undesirable chemicals from water.

Student Action: Stating in effect that as the earth's population increases, increasing amounts of water are used again and again before they reach the sea and therefore it becomes increasingly difficult to remove the increasing amounts of undesirable materials from the water or that new kinds of pollutants, which the old methods of purification do not remove, are being added to water.

Performance Check A: Many cities and towns which draw water from nearby rivers are finding that the methods they use to purify their drinking water are no longer good enough. Therefore, they are building new water purification plants that use more effective methods to get the water "clean" enough for human use. Explain why the older, simpler methods of water purification no longer work.

ES 02 Core 11

Remediation: (1) Have the student review the first and second paragraphs on page 31. (2) Review Self-Evaluation 4-1.

ES O2 Core 12

Recognizes the effects of detergent water on newly planted seeds.

The student recalls the effect of detergent water on the growth of newly-planted seeds.

Student Action: Responding to the effect that detergents interfere with the germination of seeds and the health of seedlings.

Performance Check A: Mary Beth decided to put potted flowering plants around her kitchen. She bought seeds and planted them. After several weeks, she noticed that fewer seeds germinated in the pots near the sink where they got splashed when she washed the dishes. Those seedlings that did come up looked less healthy than the other plants. What probably is the cause of these differences?

Remediation: (1) Check the student's answers to questions 4-2 through 4-6 on page 36. (2) If the concept is not clear, discuss Table 4-1 with the student. (3) Have the student review an acceptable response to Self-Evaluation 4-1.

ES O2 Core 13

Selects the best prediction of the results of a second activity using related organisms.

The student applies the concept that the results of activities on one type of organism suggest what might happen to another organism but cannot be used to make exact predictions about the other organism.

Student Action: Selecting the statement to the effect that the detergent will probably cause a lower germination rate, but one cannot be sure because only radish seeds were tested in the activity.

A: e
B: c
C: d

Performance Check A: Ms. Kelly's students studied the effect of detergent on the germination of seeds. Her students used bean, corn, tomato, and pumpkin seeds. On the basis of your work with radish seeds, select the best prediction below that you can make about the results of Ms. Kelly's students' activities.

a. All of the seeds will have a lower rate of germination, just like my radish seeds.
b. I have no basis for predicting how the detergent will affect other seeds.
c. None of these seeds will show a lower germination rate because detergent affects only radish seeds.
d. I can't predict how the activities will turn out because detergent affects only root crops, such as radishes, beets, turnips, and carrots.
e. I think that the detergent will cause a lower germination rate, but I am not sure because I tested only radish seeds.

Remediation: (1) The statement "All of the seeds will have a lower rate of germination, just like my radish seeds" seems to be verified by the answer given to question 4-6 in the paragraph at the top of page 37. (2) Ask the student if all plants look alike, all fruits taste alike, all plants use the same amount of sunlight, or all plants take the same fertilizers. If he answers any of these questions negatively, ask him how he knows that all plants are influenced the same way by detergent. Point out to him that when predictions are made for situations involving a new variable, the prediction should involve a certain amount of uncertainty. (3) If he answers that he has no basis for prediction, discuss the fact that all plants need rain and light, so there are some requirements that plants have in common.

ES O2 Core 14

Describes how to determine if a certain insecticide affects germination.

The student generates a procedure to determine if an insecticide affects the germination of seeds.

Student Action: Describing a procedure that changes only one variable at a time and uses a control sample.

Performance Check A: Many farmers spray their fields with insecticides to try to kill off all the harmful insects. Experiments with some of these insecticides show that they remain in the soil for several years. Describe an activity that you could do to determine whether the insecticide Malathian will affect the germination of squash seeds.

Remediation: (1) If the student is not able to generate the activity taking into account the criteria above and if ISCS Level II materials are available, refer him to Excursion 4-1 on page 381 of the Level II text. (2) Discuss Problem Break 4-1 with him, stressing the ideas of changing only one variable at a time and of using a control sample. (3) To determine if the student then has the concepts of a variable held constant and a control, have him review Activities 3-4 through 3-6 and state which variable or variables were held constant. Also ask him to identify the control if there is one and to suggest one if there is not and to state why a control is needed. (Answer: A sample of milk and water would be a control. Since these were not used, the results could be due to the natural action of milk on methylene blue.)

ES O2 Core 15

Defines *biodegradable*.

The student recalls the definition of *biodegradable*.

Student Action: Responding to the effect that biodegradable materials are chemicals that can be decomposed by organisms.

Performance Check A: Human body wastes are biodegradable. What does *biodegradable* mean?

Remediation: (1) Check the student's answer to Self-Evaluation 4-4. (2) Refer him to Figures 4-2 and 4-3 on pages 38 and 39. (3) If necessary, discuss these figures with the student.

ES O2 Core 16

Explains how biodegradable chemicals cause a rapid decrease of dissolved oxygen in lakes.

The student applies the notion of the relationship between the introduction of biodegradable chemicals and the rapid decrease in the dissolved oxygen in a lake.

Student Action: Stating in effect that biodegradable chemicals serve as a food source for algae and thus allow the algae population to reproduce rapidly and that the excess number of algae and of microorganisms that feed on algae wastes uses up the dissolved oxygen in the lake.

Performance Check A: The Lunie Chemical Plant has begun to dump biodegradable chemicals into a nearby lake. A rapid decrease of dissolved oxygen in the lake has been noticed. Describe how the biodegradable chemicals can cause the rapid decrease of dissolved oxygen in the lake.

Remediation: (1) Refer the student to Figure 4-2 on page 38 and to the paragraph preceding it. (2) If necessary, discuss Figure 4-2 with him.

ES O2 Core 17

States how biodegradable substances may cause pollution.

The student applies the concept that biodegradable substances while being broken down into simpler substances may produce an increase in food supply for an organism which then increases its population, thereby increasing its oxygen demand and removing dissolved oxygen from the water.

Student Action: Selecting the response to the effect that biodegradable substances may feed organisms in streams which will, in turn, become overpopulated.

A: c
B: a
C: d

Performance Check A: The fact that a product is biodegradable is not a guarantee that it will not pollute a stream. Which of the following best states how biodegradable substances can cause pollution?

a. They cannot be broken down into simpler substances by living organisms.
b. They can be broken down into simpler substances by living organisms.
c. They may be a food source for organisms in streams which will, in turn, become overpopulated.
d. They will not be a food source for organisms, thereby decreasing the organisms' population.

Remediation: (1) Check the student's response to Self-Evaluation 4-1. (2) Have him read from the last paragraph on page 37 through the first paragraph on page 39. If necessary, discuss Figure 4-2 with him.

ES O2 Core 18

Recognizes the effects of pesticides on the environment.

The student applies the concept that nonbiodegradable pesticides have side effects which reach beyond the area in which they are used.

Student Action: Responding negatively and to the effect that nonbiodegradable pesticides are often spread by such carriers as rainwater that runs off the field, insects which consume nonfatal amounts of the pesticide, and wind-carried dust particles.

Performance Check A: Consider the following situation.

Irving Schmidt, a farmer, uses airplanes to dust his crops with nonbiodegradable pesticides. Since he only sprays when there is no breeze, he says that the wildlife in and around a pond down the hill is not affected by his spraying.

1. Is Irv correct?
2. Defend your answer.

Remediation: (1) Check the student's answers to Self-Evaluations 4-10 and 4-12. (2) Check his answer to question 4-10 on page 40.

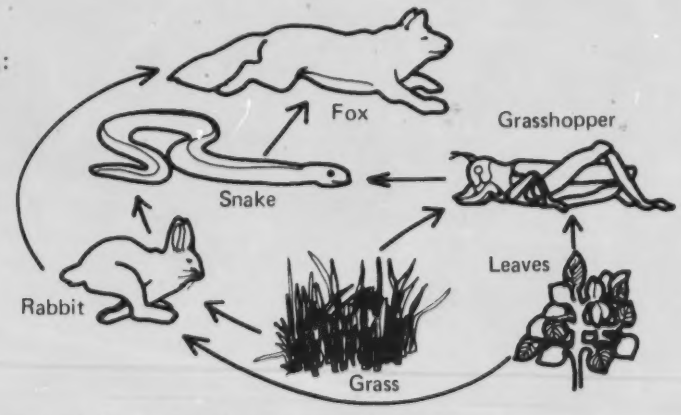
ES O2 Core 19

Names and explains a system of organisms in which some are input for others.

The student recalls the term which describes a system of organisms in which some are input for others and the meaning of arrows in a diagram of such a system.

Student Action: Responding with the term *food web* and to the effect that the organism at the tail of each arrow is eaten by (is input to) the organism at the head of each arrow.

Performance Check A:



1. State the term used for the system shown above.
2. Explain what the arrow between the rabbit and the fox in the diagram means.

Remediation: (1) Have the student review Figure 4-5 on page 40. (2) Refer him to the second paragraph on page 41 for a definition of *food web*. (3) If necessary, discuss Figure 4-5.

ES O2 Core 20

Explains the disappearance of some nonbiodegradable chemicals from rivers.

The student applies the concept that some nonbiodegradable chemicals are absorbed by living things or settle out.

Student Action: Stating an explanation which includes the effect of the notions that many nonbiodegradable chemicals are absorbed by living plants or animals or settle to the bottom of the river.

Performance Check A: The waste that flows from a certain factory into a river contains large quantities of a nonbiodegradable chemical. A chemist tested a sample of water taken from a few miles downstream from the factory. He could find less of this chemical in the river water. State two reasons which account for the disappearance of some of this chemical from the water.

Remediation: (1) Check the student's answer to question 4-9 on page 39 to see if he understands the absorption of nonbiodegradable chemicals by living organisms. (2) Suggest that he review the second and third paragraphs on page 39 and Figure 4-3 on the same page.

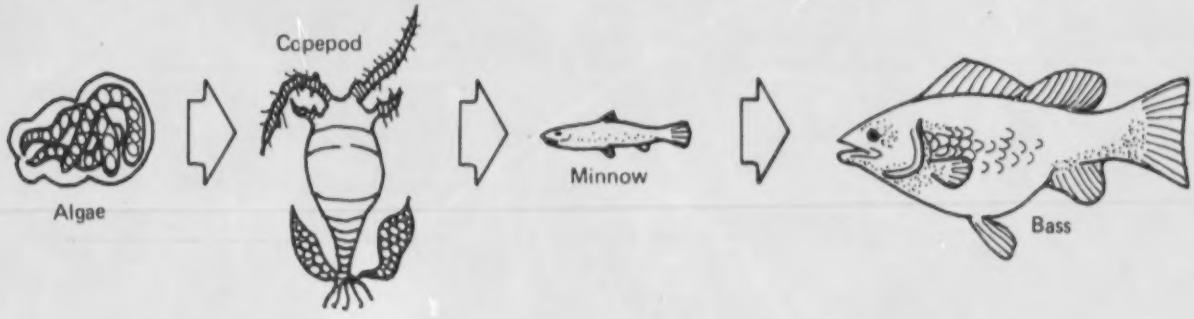
ES O2 Core 21

Locates the extremes of concentrations of a nonbiodegradable chemical in a food chain.

The student applies the concept that the concentration of a nonbiodegradable chemical increases with the level of an organism in a food chain.

Student Action: Stating that the organism near the top of the food chain will contain the highest concentration and the organism near the bottom of the food chain will contain the lowest concentration.

Performance Check A: The diagram below shows four organisms in part of the food chain in a freshwater lake that has been polluted with DDE, a nonbiodegradable chemical that accumulates in the body of living organisms.



1. In which type of organism would you expect to find the highest concentration of DDE?
2. In which type of organism would you expect to find the lowest concentration of DDE?

Remediation: (1) Check the student's answer to Self-Evaluation 4-5. (2) Check his answer to question 4-11 on page 41. (3) If necessary, discuss Figure 4-6, page 41, with your student.

ES O2 Core 22

Names characteristics of an ideal detergent.

The student generates the characteristics of an ideal detergent.

Student Action: Responding with the notion of one of the following: That an ideal detergent would (1) break down after use into harmless nonnutritive materials, (2) react with other sewage materials to be removed in settling basins, or (3) any suitable alternative.

Performance Check A: Some widely used detergents can be decomposed by living organisms and are a huge source of food for them. The population of these organisms increases so greatly that their waste products become serious pollutants. Other detergents which are not easily decomposed can accumulate and kill organisms. What would be the characteristics of the ideal detergent?

Remediation: Discuss points 1 and 2 in the third paragraph on page 37 with the student.

ES O2 Core 23

Defends or modifies his response to a problem break in Chapter 4.

The student generates a defense or modification of the arguments in his response to Problem Break 4-4 or Problem Break 4-5 based on the effects of the chemical in question on the biosphere, on the people who manufacture and use the chemical, and on how a ban might affect large numbers of people who depend on the products of the industries that use this chemical.

Student Action: Stating at least one reason why the chemical should be banned and one reason why it should be allowed.

Performance Check A: Take your *Record Book* to your teacher. Your task is either to defend your written response to Problem Break 4-4 or 4-5 or to make a satisfactory change in any part of it that your teacher questions.

Remediation: (1) Ask the student to describe one benefit of the chemical to man. This may be something the student knows on his own, rather than something that is specifically expressed in the text. (2) Then ask the student to describe a possible harmful effect of the chemical. The food web diagramed on pages 40 and 42 may offer a clue, as may the answer to question 4-6, page 36.

ES O2 Core 24

States the effect of temperature on the rate of a chemical reaction.

The student applies the concept of the effect of temperature on the rate of a reaction.

Student Action: Stating in effect that raising the temperature increases the rate of a chemical reaction.

Performance Check A: Milk undergoes a chemical reaction during storage. Milk is kept in the refrigerator rather than out in the warm air. Why does storing milk in the refrigerator keep it fresh longer?

Remediation: (1) Check the student's answers to Self-Evaluations 5-3 and 5-4. (2) Check his answer to question 5-1 on page 45.

ES O2 Core 25

Interprets temperature data to indicate warm-blooded and cold-blooded animals.

The student classifies animals as either warm-blooded or cold-blooded, using given temperature data.

Student Action: Indicating that those animals whose body temperatures remain relatively constant when the temperature of the surroundings change are warm-blooded and that those animals whose body temperatures vary with the temperature of the surroundings are cold-blooded.

A: 1. warm-blooded, 2. cold-blooded, 3. warm-blooded
B: 1. cold-blooded, 2. warm-blooded, 3. warm-blooded
C: 1. warm-blooded, 2. cold-blooded, 3. cold-blooded

Performance Check A: Gina measured the body temperatures of three different animals. She then changed the temperature of their surroundings, waited two hours, and measured their body temperatures again. Her data are shown below.

TEMPERATURE OF SURROUNDINGS (in °C)	BODY TEMPERATURE (in °C)		
	Animal 1	Animal 2	Animal 3
29	40	30	29
44	40	43	29

Indicate whether each of the animals is warm-blooded or cold-blooded.

Remediation: (1) Check the student's answer to Self-Evaluation 5-5. (2) For definitions of *cold-blooded* and *warm-blooded*, see the paragraph following question 5-3 on page 48.

ES O2 Core 26

Relates changes in the activity of a cold-blooded animal to temperature.

The student generates the explanation that the activity of a cold-blooded animal varies with the temperature of its surroundings because of changes in its body chemistry.

Student Action: Stating an explanation which includes the idea that under warm conditions the chemical reactions in cold-blooded animals proceed at faster rates than under cold conditions, thereby releasing more energy and causing the animal to be more active.

Performance Check A: In the body of a rattlesnake, chemical reactions occur which release energy to the snake. The rattlesnake is a cold-blooded animal. When the weather gets cold, the activity of rattlesnakes drops, only to increase again when the temperature increases. Use what you have learned to explain why this is so.

Remediation: Review the student's answers to questions 5-2 through 5-5 on page 48.

ES O2 Core 27

Defines *thermal death point.*

The student recalls the definition of *thermal death point.*

Student Action: Stating the definition of *thermal death point* in effect as the temperature at or above which an organism will die.

Performance Check A: What is meant by the term *thermal death point*?

Remediation: (1) Check the student's answers to Self-Evaluations 5-6, 5-7, and 5-9. (2) Have him review the paragraph above Figure 5-1 on page 49. (3) Check his answer to question 5-7 on page 50. If necessary, discuss Figure 5-1, page 49, with him.

ES O2 Core 28

Explains the death of fish put into a hot environment.

The student applies the concept of thermal death point.

Student Action: Explaining, in effect, that for each kind of fish there is a temperature at or above which that kind of fish will die (thermal death point) and that this temperature had been reached in the car.

Performance Check A: One hot August day, Mr. Keith decided to set up an aquarium. He purchased some fish. The storekeeper packaged the fish in water in a plastic bag. He assured Mr. Keith that there was enough oxygen in the bag for the fish to live about six hours. On his way home, Mr. Keith stopped at a shopping center. When he came back after about thirty minutes and unlocked his car, he found that all the fish had died. Explain what may have caused the fish to die.

Remediation: (1) Check the student's answer to Self-Evaluation 5-6. (2) Have him review the two paragraphs following question 5-6, and Figure 5-1. (3) Discuss Figure 5-1 with him if necessary.

ES O2 Core 29

Relates thermal death point and preferred temperature range.

The student applies the concept that there is no direct relationship between preferred temperature range and thermal death point.

Student Action: Responding to the effect that the type of fish that died must have had a lower thermal death point than the others.

Performance Check A: Clifton stocked his aquarium with guppies and neon tetras. Both fish have nearly the same preferred temperature range. One morning, he woke up to find that all the neon tetras had died during the night. The thermostat on the aquarium heater had stuck, and by morning the water was quite warm. Explain why one kind of fish died, but the other did not.

Remediation: (1) Check the student's answers to Self-Evaluations 5-8 and 5-9. (2) Check his responses to questions 5-7 and 5-8 on page 50. (3) If necessary, discuss the concept of a thermal death point with your student, using Figure 5-1 on page 49.

ES O2 Core 30

Explains why nonbiodegradable substances do not affect all species equally.

The student generates the idea of variability of reaction to nonbiodegradable substances in members of different species.

Student Action: Stating an explanation involving the notion that different organisms have different tolerances for nonbiodegradable substances.

Performance Check A: There have been many large fish kills because some factories have dumped certain chemicals into a stream or river. Usually only certain kinds of fish die. Explain why only certain kinds of fish die rather than all the fish in the area.

Remediation: (1) On pages 49 and 50, the student has been informed that different species have different tolerances for thermal pollution. (2) Point out to him that chlorine is poisonous, yet the small amount of it in drinking water, though fatal to many aquarium fish, is harmless to him. The reason for allowing tap water to stand for a day or two prior to adding it to an aquarium is to allow the chlorine to escape.

ES

Recognizes why fish select various areas of a body of water.

The student applies the concept that most living things have a preferred temperature range.

O2 Core 31

Student Action: Selecting the response to the effect that the surface water had warmed up, so the fish swam deeper until they found water in their preferred temperature range.

A: c
B: b
C: d

Performance Check A: George went fishing during May. He caught a lot of northern pike by fishing the weed beds in shallow water near the shore. In July he tried the same spots and had no luck there, but he found that pike were being caught in areas where the lake was deepest. Select the most likely reason below for this.

a. So many pike were caught in shallow waters that the rest decided to swim down deeper where it was safer.
b. The sun was brighter in July, so the fish swam down to where the light didn't hurt their eyes.
c. The surface water had warmed up, so the fish swam deeper until they found water in their preferred temperature range.
d. The warmer surface waters were more dense, so the fish swam deeper to find an area where the pressure was less.

Remediation: (1) Have the student review Figure 5-1 and the two paragraphs preceding it. (2) To double check the student's understanding of Table 5-1, review with him his answers to questions 5-7 and 5-8. (3) Check his responses to Self-Evaluations 5-6 and 5-9.

ES O2 Core 32

Predicts the temperature favored by fish which need high concentrations of dissolved oxygen.

The student applies the concept of the relationship between temperature and the amount of dissolved oxygen.

Student Action: Predicting that the fish will be found in cold water and stating as his reason the essence of the concept that cold water can hold more dissolved oxygen than warm water.

Performance Check A: The grayling is a type of fish that lives only in water which contains large amounts of dissolved oxygen.

1. Would you expect graylings to live in cold water or warm water?
2. Explain the reason for your answer.

Remediation: (1) Check the student's answers to Self-Evaluations 5-10 and 5-11. (2) Check his answers to questions 5-17 and 5-18 on page 55. (3) If necessary, discuss Table 5-4 to elicit the relationship between dissolved oxygen and water temperature. (4) Have him redo his check.

ES O2 Core 33

Selects the graph which shows the effect of temperature on gas solubility.

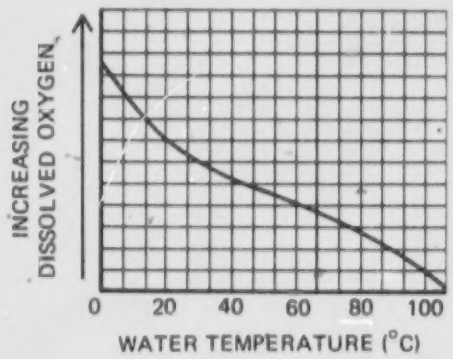
The student applies the concept that increasing the temperature of water decreases the amount of dissolved oxygen in the water.

Student Action: Selecting the graph which slopes downward to the right (a negative slope).

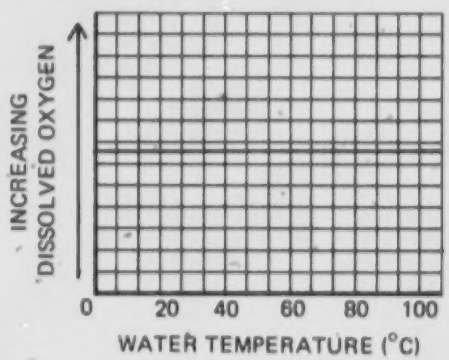
A: a
B: c
C: b

Performance Check A: Select the graph below that best shows how the temperature of water affects the amount of oxygen gas that will dissolve in water.

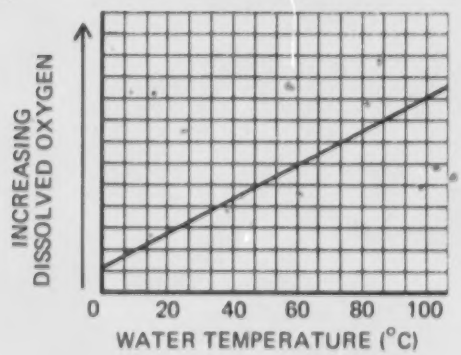
Graph a.



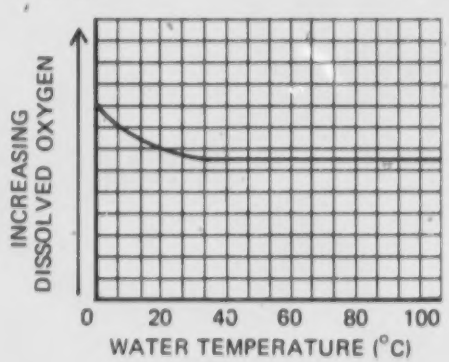
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answers to Self-Evaluations 5-1 and 5-2. (2) Check his answer to question 5-16 on page 55. (3) If he has trouble with the interpretation of graphs and ISCS Levels I or II materials are available, have the student do Excursions 17 and 18 of Level I or Excursion 7-1, Part B, of II.

ES O2 Core 34

States at which of two temperatures fish will survive longer.

The student applies the concepts of the relations among oxygen usage, oxygen supply, and temperature.

Student Action: Stating that the fish will survive longer in the cooler tank because (1) living organisms use oxygen faster at higher temperatures and (2) less oxygen can dissolve in warm water than in cold water.

Performance Check A: Rick and Laura each keep identical fish tanks in their bedrooms. The only difference between the tanks is that Rick keeps the water in his tank 10° cooler than Laura's. Both bubble air into their tanks.

1. If an accident were to cut off the supply of air to both of the tanks, would the fish survive longer in the warm or the cool tank?
2. State two reasons for your prediction.

Remediation: (1) Check the student's answers to Self-Evaluations 5-1 through 5-4. (2) Check his answers to questions 5-2 through 5-8 on pages 48 through 50. (3) If necessary, review Activity 5-5 on pages 48 and 49 with him.

ES O2 Core 35

Selects a graph showing the relationship between oxygen consumption and temperature.

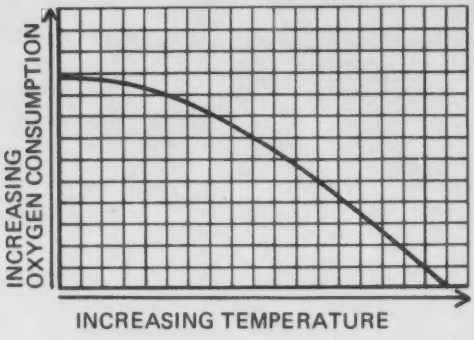
The student applies the concept that cold-blooded organisms use oxygen faster at higher temperatures.

Student Action: Selecting the graph that slopes upward to the right (a positive slope).

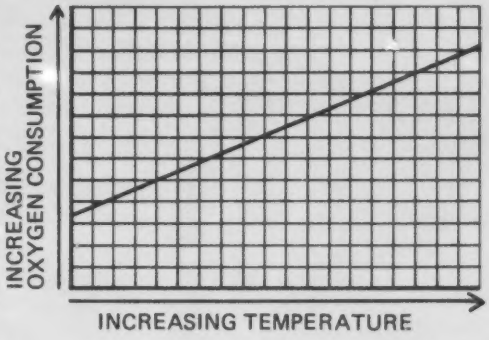
A: b
B: d
C: c

Performance Check A: Margaret wants to learn how fast sea anemones, which are cold-blooded organisms, use oxygen. She measures their rate of oxygen consumption at different temperatures. Select the graph below that best shows how you would expect the rate of oxygen consumption to relate to temperature.

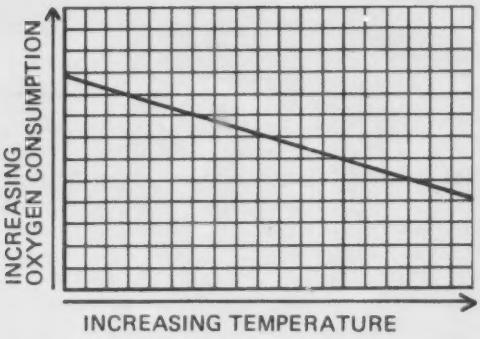
Graph a.



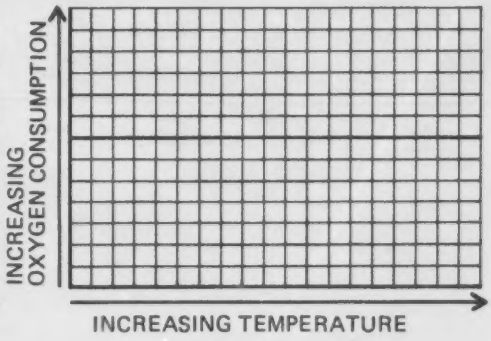
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answer to question 5-15 on page 54. (2) Have him review the first sentence of the last paragraph on page 54. (3) If interpretation of graphs is a problem and if ISCS Level I or Level II materials are available, refer the student to Excursions 17 and 18 of Level I or Excursion 7-1, Part B, of Level II.

ES

Defines *thermal pollution.*

The student recalls the definition of the term *thermal pollution.*

Student Action: Stating the effect of the definition that thermal pollution is the accumulation of heat in surface waters.

O2 Core 36

Performance Check A: What is meant by the term *thermal pollution*?

Remediation: (1) Have the student review page 57 in the text. (2) Have him review the accepted answer for Self-Evaluation 5-7, and then ask him why power plants are the chief source and not cars or houses, to see if he relates thermal pollution to water – the coolant or the absorber of heat in power plants.

Selects the statement of an effect that is not a result of thermal pollution.

ES O2 Core 37

The student recalls the effects of thermal pollution.

Student Action: Selecting the statement which disagrees with one of the following:

1. increasing the B.O.D. of living organisms,
2. decreasing the amount of dissolved oxygen in the water,
3. killing some fish by raising the water temperature above their thermal death point, and
4. driving some fish away because the water temperature is no longer within their preferred temperature range.

A: b
B: e
C: c

Performance Check A: Which of the following is not a result of thermal pollution?

a. Some fish may be killed because the water temperature is above their thermal death point.
b. The rate at which sewage is decomposed by microbes living in the water is slowed.
c. The amount of oxygen that can be dissolved in the water decreases.
d. Some fish may be driven away because the water temperature is no longer within their preferred temperature range.
e. The biochemical oxygen demand of living organisms increases.

Remediation: (1) Check the student's answers to Self-Evaluations 5-10 through 5-14. (2) Direct the student to the paragraph following Figure 5-2, page 56. (3) If necessary, discuss Figure 5-2 on page 56.

Recognizes the possible results of short-term pollution.

ES O2

The student applies the concept that pollution need not last a long time to have long-range effects on the environment.

Student Action: Responding to the effect that there are limits to the amount of pollutants with which organisms can survive for even short periods.

Core 38

Performance Check A: A state agency has agreed to permit local power plants to release water 3°C higher than usual to take care of the increased power needs. Supporters of this measure said that it was perfectly all right because the thermal pollution would be permitted only for the fairly short period of two weeks and no longer.

1. Is this sensible reasoning?
2. Explain your answer.

Remediation: (1) Have the student read the last paragraph on page 19. (2) Have him read the paragraphs between Problem Breaks 3-1 and 3-2, beginning on page 28. Does he understand that *oxygen death* means the death of many organisms, including fish, which take a long time to replace? (3) Have him read the paragraphs below question 5-1 on page 45. (4) Page 49 shows the thermal death point of certain fish. Does the student recognize the effect of exceeding this limit for even a short time? (5) Check his answers to Self-Evaluations 5-12 and 5-14.

ES O2 Exc 3-1 1

Lists factors that affect the type of vegetation in an area.

The student recalls factors that can affect the amount of water available for plants and thus the type of plants that can grow in an area.

Student Action: Listing three variables including at least two of the following: (1) temperature, (2) soil type, (3) amount of runoff, (4) amount of sunlight, (5) evaporation rate, (6) altitude, and (7) population.

Performance Check A: Parts of Kansas have the same amount of precipitation as parts of Wisconsin. However, the vegetation is not the same in these two areas. In Kansas, the vegetation is mostly grass, but in Wisconsin, the vegetation is mostly trees. List three factors which could explain these differences in vegetation in areas which have the same amount of precipitation.

Remediation: (1) Have the student read the paragraphs at the bottom of page 110 and at the bottom of page 111. (2) This may be a good time to discuss ways of conserving water, basing the discussion on Tables 1 and 2 on pages 111 and 112.

ES O2 Exc

Explains why disputes about water rights are increasing.

The student applies the concept that the amount of water used has increased rapidly and is expected to continue to increase rapidly.

Student Action: Stating in effect that these disputes have arisen and are likely to continue to rise because the rapid rate of increase in the amount of water used has meant that certain areas are running short of water and are attempting to get more water wherever they can.

3-1
2

Performance Check A: In recent years, several disputes have arisen between Canada and the U.S. about water rights in rivers that flow from one country to the other. For example, the U.S. wants Canada to agree to restrict the amount of water that is drawn from the Columbia River so that a certain minimum amount will always flow down the river into the U.S.

1. Why weren't there as many arguments about the water flow thirty years ago?
2. Explain why some people think that these disputes about the water flow will continue and become even more serious in the future.

Remediation: (1) Have the student review the last paragraph on page 112. (2) Ask him to review Table 2 on page 112 and reconsider his answer to the check.

ES
O2
EXC
3-1
3

Recommends the vegetation for an area with little water.

The student generates the notion that solutions to practical environmental problems are often compromises from among several sets of values.

Student Action: Responding to the effect that a compromise be struck between trees for beauty and soil erosion and grass for erosion control without the high loss of water to the atmosphere.

Performance Check A: The rate at which trees lose water to the atmosphere is about twenty times greater than grass. Both trees and grass are used to prevent soil erosion. A hilly area surrounding a new housing project is to be planted, but the amount of water in the ground is slightly low.

1. As the person in charge of the planting, would you plant trees only, grass only, or some of each?
2. Explain your answer.

Remediation: Have the student read the last paragraph on page 112. Use it as a springboard for a discussion of whether or not esthetics are an important consideration in environmental problems.

ES
O2
EXC
3-1

Orders events of the water cycle.

The student applies the concept that evaporation and precipitation are components of a cyclic process.

Student Action: Arranging the items listed in a sequence which reflects the following cycle: evaporation, precipitation, runoff, and becoming part of a larger body of water.

A: 2, 1, 3, 4
B: 2, 3, 1, 4
C: 4, 1, 3, 2

4

Performance Check A: Start with component number 2 below. Arrange the other components by number into the system known as a water cycle to show the order in which they occur.

1. Evaporation
2. Water flowing in a river
3. Precipitation
4. Water runoff in a drainage ditch

Remediation: (1) Review the student's answers to questions 1 and 2, page 109, Excursion 3-1. (2) Refer him to Figure 1 on page 108. Ask him to describe the system to you as it is pictured.

ES O2 Exc 4-1 1

Defines *plant growth* operationally.

The student applies the concept that different operational definitions can be used to detect and measure a quantity as long as each operational definition is related to the variable to be measured.

Student Action: Stating two different operational definitions for *plant growth* which involve change in the plant, such as the distance from the ground to the top-most leaf, the number of leaves, or the maximum spread of leaves from the stem, and a way to measure the change.

Performance Check A: Vivian is doing some experiments on the growth of plants. She needs to define *plant growth* operationally. Give two operational definitions for *plant growth*. In other words, state two ways to detect and to measure the growth of Vivian's plants.

Remediation: (1) Check to see how the student filled in Table 1 on page 116, especially the "Additional Observations" column. (2) If there is a plant in the room, have the student describe ways it will change as it grows. Then ask him how he would be able to detect growth changes and measure them. (3) If the student has any problems with operational definitions and if Level I ISCS materials are available, have him review pages 22 through 25 of the Level I text.

ES O2 Exc

Describes an experiment in which the appropriate variables are held constant.

The student generates a description of an experiment in which one variable is held constant.

Student Action: Describing an experiment in which only the one variable that is to be investigated is changed and all others are held constant.

Performance Check A: Most towns treat their drinking water with chemicals which contain chlorine and fluorine. Rainwater usually does not contain these chemicals. Describe an experiment that you could do to discover whether rainwater and tap water have different effects on the rate of germination and the growth of the seeds which germinate. Be sure to state which variables should be held constant and which should vary.

4-12

Remediation: (1) Review with the student how variables are applied to the experimental procedure described in Activities 1 through 7. (2) If he varied more than one variable in his procedure, ask him to describe how he could be sure that his results are not the result of varying the second variable rather than the first. (3) If he varied the wrong variable, discuss with him the interpretation of his results in terms of what he set out to determine.

ES 03

Chapters 6 thru 8

Excursions 6-1 thru 8-1

Performance Check

Summary Table

Objective Number	Objective Description
ES-03-Core-1	Relates people to air pollution
ES-03-Core-2	Recognizes the states of matter in which air pollution occurs
ES-03-Core-3	States an operational definition for *solid-particle air pollution*
ES-03-Core-4	Explains why cars and trucks account for most air pollution
ES-03-Core-5	Selects the combustion product that is not a major pollutant
ES-03-Core-6	Selects effects of air pollution
ES-03-Core-7	Recognizes the costs of polluting the environment
ES-03-Core-8	Recognizes the extent of air pollution
ES-03-Core-9	Selects the graph showing the greatest population explosion
ES-03-Core-10	Relates the number of births and deaths in a constant population
ES-03-Core-11	Interprets a graph of births and deaths
ES-03-Core-12	Selects a graph showing the typical population change
ES-03-Core-13	Lists four variables that could limit the size of a nonhuman population
ES-03-Core-14	Lists variables, now controlled, which led to the population explosion
ES-03-Core-15	Defends or modifies his solution to Problem Break 8-1 or Problem Break 8-3
ES-03-Core-16	Defends or modifies his solution to Problem Break 8-2
ES-03-Core-17	Calculates the time required for a population to reach a certain size
ES-03-Core-18	Decides whether higher death rate or lower birthrate is more desirable to stabilize popula-
	tion and explains his choice

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						✓				applies	
						✓				applies	
						✓				generates	
						✓				applies	
				Q						recalls	
				Q		✓				recalls	
								✓		applies	
						✓				applies	
				Q		✓				classifies	
				Q		✓				applies	
				Q		✓				applies	
				Q		✓				recalls	
						✓				recalls	
										generates	
		O								generates	
		O								generates	
							✓			generates	
								✓		generates	

ES 03

Objective Number	Objective Description
ES-03-Exc 6-1-1	Relates a temperature inversion to an increase in air pollution
ES-03-Exc 6-1-2	Names a major cause of temperature inversions
ES-03-Exc 6-1-3	Selects graphs showing normal conditions and a temperature inversion
ES-03-Exc 7-1-1	Selects variables that directly influence population size
ES-03-Exc 7-1-2	Matches the results of population experiments to experimental conditions
ES-03-Exc 7-2-1	Remembers the characteristics of planets suitable for human habitation
ES-03-Exc 7-3-1	Predicts trends in family size from population curves
ES-03-Exc 7-3-2	Gives possible reasons for a decline in life expectancy
ES-03-Exc 7-3-3	Predicts data from a graph by extrapolating
ES-03-Exc 8-1-1	Recognizes the effect of noise on hearing
ES-03-Exc 8-1-2	Selects the graph showing the relationship between hearing loss and age
ES-01-Core-5R	Lists conditions favorable to epidemics
ES-02-Core-5R	Predicts a microorganism population from the initial population and its doubling time
ES-02-Core-6R	Selects the best graph of population growth versus time

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
									✓	recalls	
										recalls	
				Q			✓		✓	applies	
				Q		✓				recalls	
				Q				✓	✓	applies	
						✓				applies	
				Q		✓				applies	
									✓	generates	
										applies	
										generates	
				Q			✓	✓	✓	applies	
						✓				recalls	
				Q			✓			applies	
				Q		✓				applies	

ES O3 Core 1

Relates people to air pollution.

The student applies the concept of the universal distribution of air pollution.

Student Action: Responding negatively and with the essence of the concept that everyone is directly or indirectly a source of air pollution or with examples that illustrate the concept.

Performance Check A: Dennis Oliver is quite proud of the fact that he doesn't contribute to the air pollution problem. He lives in a house that is completely powered by electricity. He has sold his car and now travels to and from work, using the city's electrically-powered rapid transit system.

1. Is Dennis correct in assuming that he doesn't contribute to the air pollution problem?
2. Explain your answer.

Remediation: (1) Ask the student to list his body's output products and to state whether they contribute to pollution. (2) Check the student's answers to questions 6-5, page 61, and 6-21, page 70. (3) Have him review Table 6-2 on page 62 of the text. If the student does not have a clear understanding of his relationship to the sources of pollution shown in Table 6-2 and the fact that these sources are essential to our way of life, discuss the categories with him.

ES O3 Core 2

Recognizes the states of matter in which air pollution occurs.

The student applies the concept that air pollution can occur in all three states of matter.

Student Action: Responding negatively and with the essence of the concept that air pollution can occur in the form of solid particles, liquids, or gases.

Performance Check A: A certain factory in Millsville has always been considered a major source of air pollution because of the black soot from its smokestack. Recently a filtering system was installed that collects the solid particles as they travel up the smokestack. Now the sky above the stack is always clear.

1. Does this factory no longer contribute to air pollution?
2. Explain your answer.

Remediation: (1) Check the student's entries in Table 6-1 on page 60. Did his descriptions include solids, liquids, and gases? (2) Check his answer to question 6-2 on page 61. (3) Refer him to the paragraph following question 6-2 on page 61. (4) If he still has problems applying the results of Activity 6-3, page 60, to the industrial situation, discuss with him the real-world applications of Table 6-1 on page 60.

States an operational definition for *solid-particle air pollution.*

ES O3 Core 3

The student generates an operational definition for *solid-particle air pollution.*

Student Action: Stating a procedure involving exposing sticky tape for a certain period of time and then counting the particles in a unit area of the tape.

Performance Check A: In Chapter 6, you used a piece of sticky tape to study solid-particle air pollution. Write an operational definition for *solid-particle air pollution*, using the sticky-tape method.

Remediation: (1) Remind the student that an operational definition is a description of how he would detect and measure the term being defined. (2) If the book is available, have him review pages 6 and 7 of the Level III text, *Investigating Variations.* (3) If Level I materials are available and the concept of an operational definition is not clear to the student, have him review page 11 in Chapter 2.

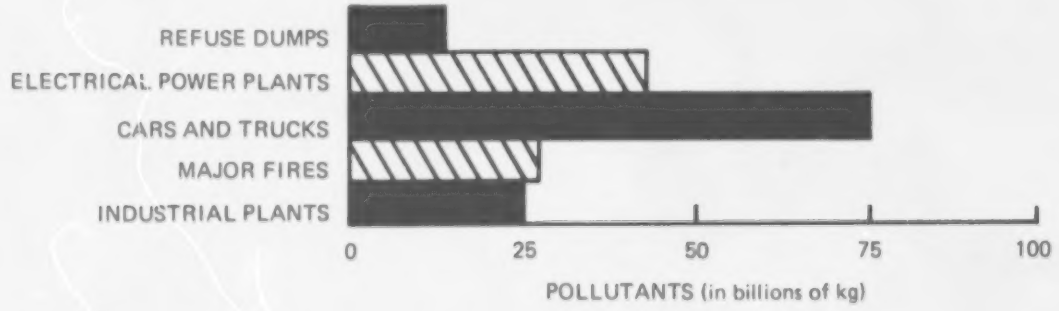
Explains why cars and trucks account for most air pollution.

ES O3 Core 4

The student applies the concept that the total amount of pollution resulting from a class of polluters is the product of the amount of pollution per unit times the number of polluters in the class.

Student Action: Responding that whereas the pollution from a single car or truck is small compared to other sources, the total number of cars and trucks is so great that the total amount of pollution from them is greater than from any other source listed.

Performance Check A:



Consider the size of refuse dumps, electrical power plants, cars and trucks, major fires, and industrial plants. How do you explain the fact that cars and trucks, which individually are so small, produce the greatest amount of pollution as shown above?

Remediation: (1) Have the student review his answer to question 2-13, the subsequent paragraph, and the last paragraph on page 19. (2) Have him review Self-Evaluation 6-7.

ES O3 Core 5

Selects the combustion product that is not a major pollutant.

The student recalls that the products of combustion considered to be major pollutants include carbon monoxide, unburned hydrocarbons, nitrogen oxides, sulfur oxides, and solid particles.

Student Action: Selecting the combustion product not considered to be a major pollutant.

A: e
B: c
C: b

Performance Check A: The substances listed below are products of combustion. Which one is not considered to be a major pollutant?

a. Nitrogen oxides
b. Sulfur oxides
c. Solid particles
d. Unburned hydrocarbons
e. Carbon dioxide

Remediation: Have the student review Table 6-3 on page 63, and if necessary, discuss with him those items not clear to him.

ES O3 Core 6

Selects effects of air pollution.

The student recalls possible effects of air pollution as (1) increasing some human diseases, (2) damaging crops, (3) weakening or killing domestic and wild animals, (4) discoloring and damaging clothes, autos, and buildings, (5) increasing the rate of deterioration of steel, rubber, glass, leather, nylon, paper, and stone, and (6) causing discoloration or peeling of paint.

Student Action: Selecting the option "all of these."

Performance Check A: Select the answer that best describes the possible effects of air pollution.

a. Kills or weakens animals
b. Causes rubber and nylon to deteriorate
c. Causes damage to crops
d. Increases the rate at which stone breaks down
e. All of these

Remediation: (1) Have the student read pages 68 through 70. (2) Have him review Self-Evaluations 6-4 and 6-5.

ES O3 Core 7

Recognizes the costs of polluting the environment.

The student applies the concept that pollutants are responsible for costly damage to the environment.

Student Action: Responding with the effect of the concept that pollutants cause costly damage and with at least two examples of such damage, such as animal and human illness or death and the destruction of crops or nonliving materials.

Performance Check A:

Sheila: Forcing industry to remove pollutants from the output of factories means that factories have to buy expensive equipment.

Kitty: Yes, but not removing the pollutants is expensive to lots of other people.

Sheila: What? How can not spending money to remove pollutants cost money?

On your answer sheet, write a good response for Kitty to make. Include at least two examples of how releasing pollutants is expensive.

Remediation: (1) Have the student review pages 68 through 70. (2) Also review with the student his responses to Self-Evaluations 6-4 and 6-5. (3) Students may have difficulty in relating disease to cost. If so, a brief discussion of medical bills or loss of income with illness is in order.

ES O3 Core 8

Recognizes the extent of air pollution.

The student applies the concept of the worldwide nature of air pollution.

Student Action: Responding negatively and to the effect that air pollution cannot be entirely escaped by moving out of a city because no area of the world is free of air pollution.

Performance Check A: Mr. Singer is quite concerned about the effect of the increasing air pollution in the city where he lives. He plans to move to a farm to escape all the air pollution.

1. Will he escape air pollution by moving to the country?
2. Explain your answer.

Remediation: (1) Check the student's answer to question 6-20 on page 70. (2) Have him review the paragraph at the top of page 70.

ES
O3
Core
9

Selects the graph showing the greatest population explosion.

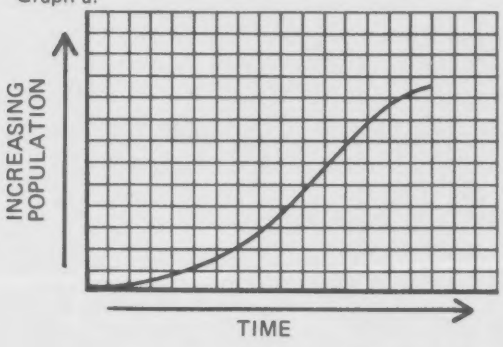
The student classifies the curve whose slope increases most rapidly as the curve showing a population explosion.

Student Action: Selecting the graph which is concave upward.

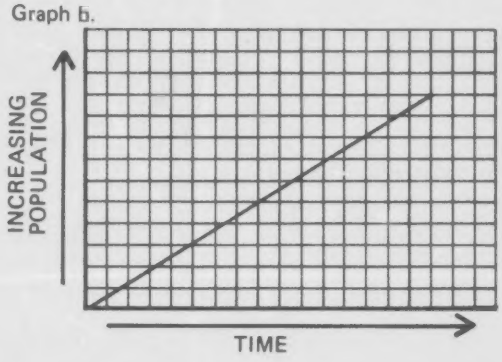
A: c
B: b
C: d

Performance Check A: Which of the following graphs shows the greatest population explosion?

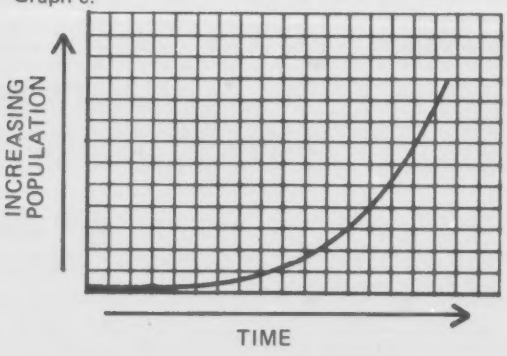
Graph a.



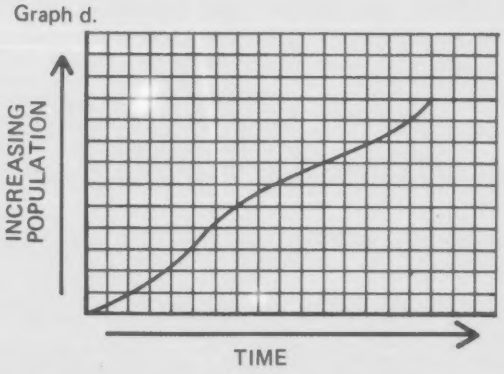
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answers to Self-Evaluations 7-1 and 7-2. (2) Check his answer to Self-Evaluation 7-5. If necessary, ask him the relationship between the graph on page 74 of the text and the term *population explosion.* (3) If interpretation of graphs is a problem and ISCS Level I or Level II materials are available, refer the student to Excursion 5 of Level I or Excursion 7-1, Part B, of Level II.

ES 03 Core 10

Relates the number of births and deaths in a constant population.

The student applies the concept that the population remains constant when the number of deaths equals the number of births.

Student Action: Supplying the number of deaths for one year and the number of births for another year so that the number of births and deaths are equal for each of those years.

A: 1. 130, 2. 50
B: 1. 114, 2. 44
C: 1. 148, 2. 56

Performance Check A: Ron raises hamsters in the garage. Over the years, his hamster population has grown considerably. His mother has laid down the law! If his hamster population gets any larger, she will make him get rid of all his hamsters.

By answering the questions below, show how births must be related to deaths to keep the population constant. Assume that no hamsters are sold, are given away, or escape.

1. How many deaths must there be in 1975 to result in a constant population?
2. How many births can there be in 1976 to result in a constant population?

YEAR	1972	1973	1974	1975	1976
Population at end of year	52	102	169	169	169
Births	46	85	120	130	?
Deaths	2	35	53	?	50

Remediation: (1) Have the student review the first paragraph on page 80 and the figure following. (2) Have the student review the graph made from Table 7-2 on page 77. If necessary, discuss the graph with the student.

ES 03 Core 11

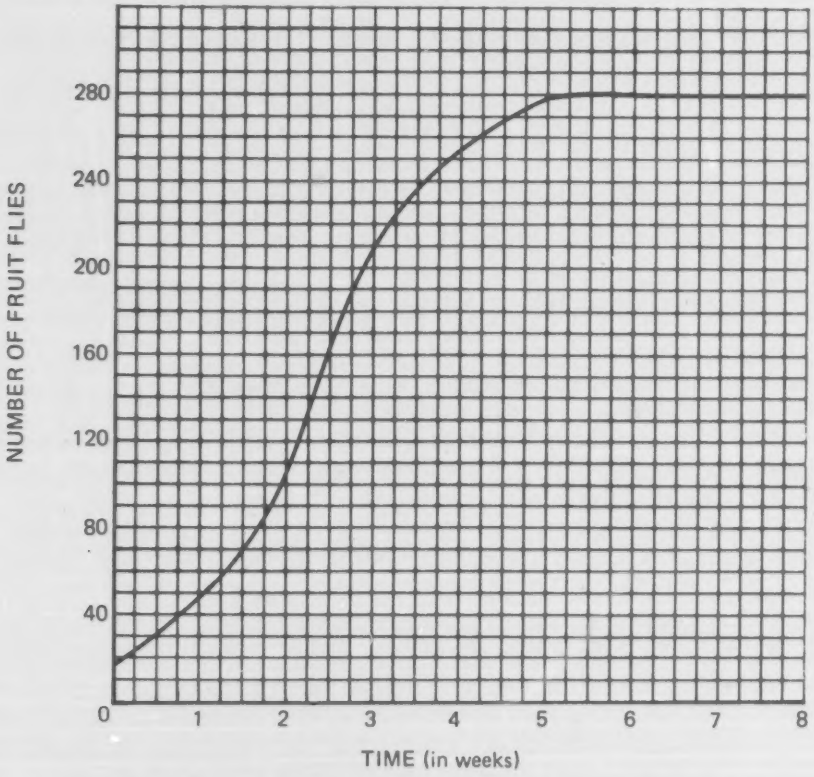
Interprets a graph of births and deaths.

The student applies the concept that when the number of births equals the number of deaths in the population, the population size remains constant.

Student Action: Indicating the first point of time at which the curve is parallel to the time axis, to within ±.25 of a week.

A: 5 ±.25 weeks
B: 6 ±.25 weeks
C: 4 ±.25 weeks

Performance Check A: Roger kept a culture of fruit flies for several months. He added the same amount of food each day. Every week he counted the number of live flies. Then he drew the graph shown below. At what point in time is the number of deaths in the population equal to the number of births?



Remediation: (1) Check the student's answer to Self-Evaluation 7-8, part A. (2) Check the student's answer to question 7-7 on page 77. (3) If interpretation of graphs is his problem and ISCS Levels I or II materials are available, refer the student to Excursion 5 of Level I, or Excursion 7-1, Part B, of Level II.

ES O3 Core 12

Selects a graph showing the typical population change.

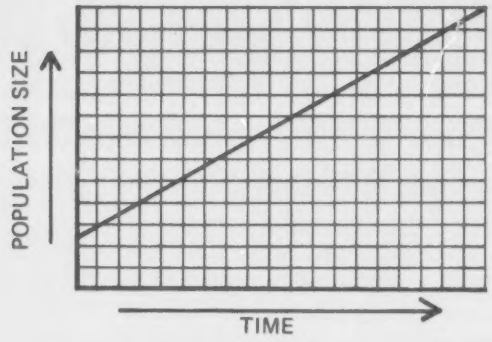
The student recalls that population studies of many plants and animals indicate that an S-shaped curve is a typical curve for an increasing population.

Student Action: Selecting a graph showing an S-shaped (sigmoid) population curve.

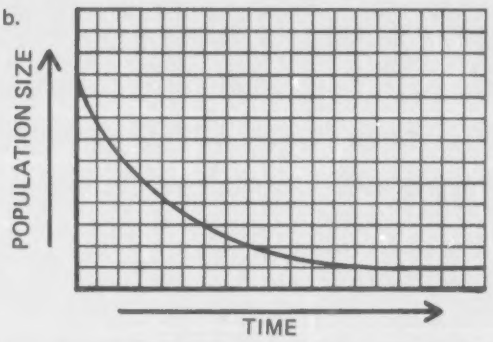
A: c
B: d
C: a

Performance Check A: Which graph below best indicates how populations of plants and animals usually change with time?

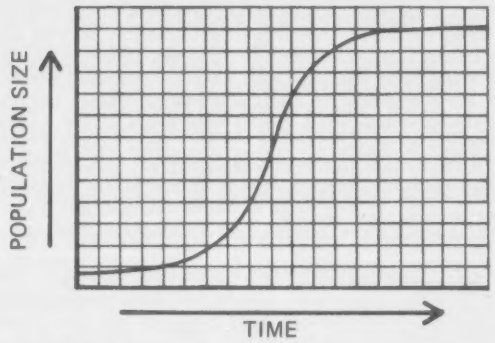
Graph a.



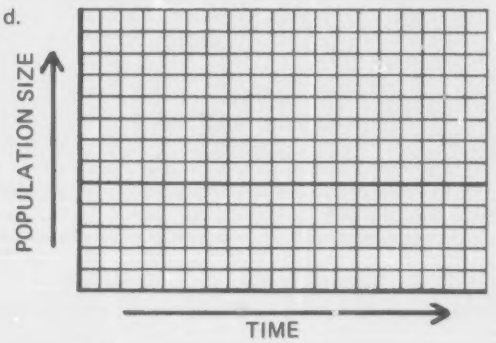
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answers to Self-Evaluations 7-1 through 7-3. (2) Have him review Figures 7-4 and 7-5 on page 78 of the text. (3) Check his answers to questions 7-8 through 7-10 on page 78. (4) If graph interpretation seems to be his problem and ISCS materials for Levels I or II are available, refer the student to Excursion 17 of Level I or Excursion 7-1, Part B, of Level II.

Lists four variables that could limit the size of a nonhuman population.

ES O3 Core 13

The student recalls the variables that could effectively limit the size of a nonhuman population.

Student Action: Stating four variables, at least three of which express the notions of the following:

1. the presence of disease organisms,
2. the presence of wastes and poisons,
3. the availability of food and necessary gases,
4. the availability of space, and
5. the presence of man.

Performance Check A: What are four variables that could limit the size of a nonhuman population?

Remediation: (1) Review the student's answer to Self-Evaluation 7-3. (2) If necessary, refer the student to the list of variables in the middle of page 79.

ES O3 Core 14

Lists variables, now controlled, which led to the population explosion.

The student generates a list of variables that man has learned to control which made possible the current increase in population.

Student Action: Listing at least two of the following variables or examples of them: disease, disease carriers, sanitation, food storage, and food production.

Performance Check A: The number of people on the earth increased very slowly until about 1700. What variables, if any, has man learned to control or change that have allowed the human population to increase so rapidly since 1700?

Remediation: (1) Check the student's answer to Self-Evaluation 7-5. (2) Check his answer to question 7-16, page 80. (3) Refer him to page 5 of the text and, if necessary, discuss with him some of the ideas expressed there.

ES O3 Core 15

Defends or modifies his solution to Problem Break 8-1 or Problem Break 8-3.

The student generates arguments both for and against banning a chemical, based on the effects of that chemical on the biosphere.

Student Action: Stating at least one defense or modification of his position that the chemical should be banned and one defense or modification of his argument that its use should be continued.

Performance Check A: Take your *Record Book* to your teacher. Your task is either to defend your written response to Problem Break 8-1 or Problem Break 8-3 or to make a satisfactory change in any part of it that your teacher questions.

Remediation: Have the student consider each of the points listed on page 92.

ES O3 Core 16

Defends or modifies his solution to Problem Break 8-2.

The student generates arguments both for and against allowing an industry, which is a potential source of both revenue and pollution, to locate in a financially poor state.

Student Action: Stating at least one defense or modification of his argument that the industry should be allowed to locate in the state and one defense or modification of his argument that the industry should not be allowed to locate in the state.

Performance Check A: Take your *Record Book* to your teacher. Your task is either to defend your written response to Problem Break 8-2 or to make a satisfactory change in any part of it that your teacher questions.

Remediation: (1) Have the student consider each of the points listed on page 92. (2) If necessary, point out to the student the importance of considering both positions.

ES O3 Core 17

Calculates the time required for a population to reach a certain size.

The student generates the procedure for determining the time required for the population to reach a certain size.

Student Action: Subtracting the current population size from the specified future size, dividing this total population increase by the difference between the birthrate and the death rate, and stating the time he calculates, using this procedure. If the student's procedure is correct, give him credit for the check despite his numerical answer.

A: 5 or 6 days
B: 11 or 12 days
C: 18 or 19 days

Performance Check A: Consider the following information about the world's population.

Present world human population = 3,800,000,000
Birthrate = 316,000 per day
Death rate = 139,000 per day

Assuming that the birthrate and the death rate stay constant, how many days will it take for the world's population to reach 3,801,000,000? Show your calculations.

Remediation: (1) Check the student's answer to question 8-6 on page 85. (2) Have him explain how he arrived at his procedure. Check for arithmetic errors.

ES O3 Core 18

Decides whether higher death rate or lower birthrate is more desirable to stabilize population and explains his choice.

The student generates an explanation for his preferred alternative to the population problem.

Student Action: Stating in effect that lowering the birthrate would create less human misery and suffering than would the conditions which would cause an increase in the death rate.

A, B, and **C:** Condition II

Performance Check A:

Birthrate (per day)	311,000 (high)
Death rate (per day)	138,200 (low)

The current world birthrate and death rate are shown above. This situation must change if the population is to stop increasing. Shown below are two possible conditions which would result in a constant population.

	CONDITION I	CONDITION II
Birthrate (per day)	311,000 (high)	138,200
Death rate (per day)	311,000	138,200 (low)

1. Which would be more desirable – Condition I, which has an increased death rate, or Condition II, which has a decreased birthrate?
2. Explain the reasons for your answer.

Remediation: (1) Have the student look at Problem Break 8-6 on page 90 and give you his interpretation for the idea of a low rate of increase in new families. (2) Have the student review Chapter 1 and ask him if, given current technology, there would come a time when the sheer mass of humans would again produce conditions like those stated on page 5. (3) Direct the student to Excursion 7-3 and see his answers to questions 12 and 13 on page 140.

ES O3 Exc 6-1 1

Relates a temperature inversion to an increase in air pollution.

The student recalls the relationship between a temperature inversion and air pollution.

Student Action: Responding, in effect, that a temperature inversion increases the concentration of air pollution by preventing the normal vertical mixing of air and trapping pollutants near the ground.

Performance Check A: State how a temperature inversion is related to an increase in the air pollution at the earth's surface.

Remediation: (1) Review the student's answer to question 3, page 122, of Excursion 6-1. (2) Review his answer to question 5, page 123. (3) If necessary, have him read the paragraph below question 5, page 123.

ES O3 Exc 6-1

Names a major cause of temperature inversions.

The student recalls a major cause of temperature inversions.

Student Action: Responding in effect that a major cause of temperature inversions is fronts (cold or warm).

Performance Check A: What is a major cause of a temperature inversion?

Remediation: (1) Check the student's answer to question 11 on page 124. (2) Have him review the paragraph following question 2 on page 122. (3) Discuss Figures 3 and 5 on pages 122 and 124 respectively.

2

ES
O3
EXC
6-1
3

Selects graphs showing normal conditions and a temperature inversion.

The student applies the concepts of variation in temperature with altitude under normal conditions and variation in temperature with altitude during a temperature inversion.

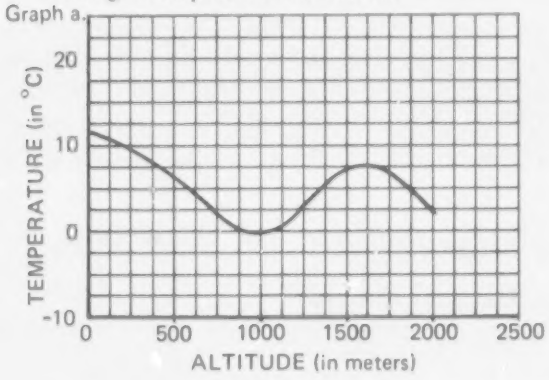
Student Action: Selecting as illustrative of normal conditions that graph which shows temperature decreasing as altitude increases and as illustrative of temperature inversion, the graph that shows temperature decreasing, then increasing, then decreasing again as altitude increases.

A: 1. d, 2. a
B: 1. c, 2. b
C: 1. a, 2. d

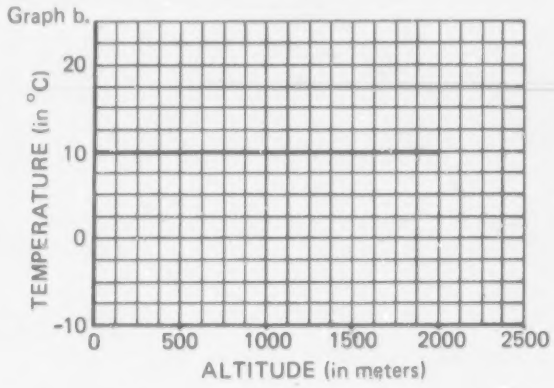
Performance Check A:

1. Which graph below shows the normal way temperature changes as altitude increases?
2. Which graph below shows the way the temperature changes with altitude during a temperature inversion?

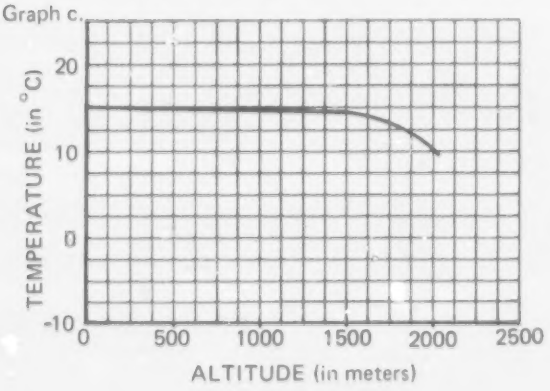
Graph a.



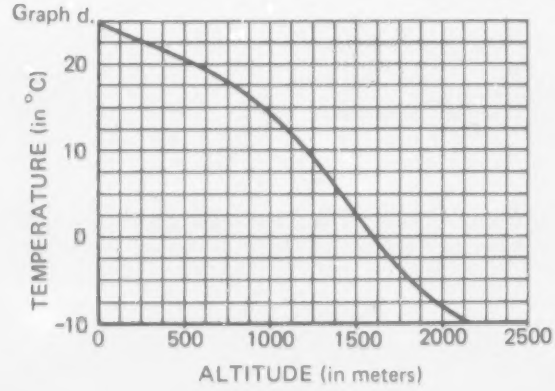
Graph b.



Graph c.



Graph d.



Remediation: (1) Check the student's answers to questions 1 and 3 on pages 121 and 122. (2) Check his graphs obtained from Tables 1 and 2 on pages 120 and 122. (3) Determine if he had difficulty because the labels for the graphs' axes in the performance check are the reverse of those used in Figure 1 on page 121. (4) If graph interpretation is a problem and if an ISCS Level I or II text is available, have the student review Excursion 17 of Level I or Excursion 7-1, Part B, of Level II.

ES O3 Exc 7-1 1

Selects variables that directly influence population size.

The student recalls the variables that directly influence the size of a population.

Student Action: Selecting two variables from among the following: the birthrate, the death rate, the rate of immigration, the rate of emigration, and the food supply.

A: a, b
B: a, d
C: c, e

Performance Check A: Which of the following variables directly influence the size of the population in any country?

a. The birthrate
b. The death rate
c. The number of cars
d. The number of redheads
e. The number of storks

Remediation: (1) Have the student review Excursion 7-1. Then review his answer to question 10 on page 128. (2) If the student does not agree that the conclusions about mice can be transferred to man and he can defend his disagreement reasonably and also explain his selection rationally, it is suggested that he be given credit for the check. His reasoning should be respected if he considers counter arguments carefully.

ES O3 Exc 7-1 2

Matches the results of population experiments to experimental conditions.

The student applies the concepts of Dr. Emlen's experiments involving mice populations.

Student Action: Matching the experimental conditions to the experimental results as follows:

1. an open system with a limited food supply results in a higher birthrate than the death rate,
2. a closed system with a limited food supply results in a low birthrate which is equal to the death rate, and
3. a closed system with an unlimited food supply results in a high birthrate which is equalled by the death rate.

A: 1. a, 2. d, 3. c
B: 1. d, 2. a, 3. c
C: 1. c, 2. d, 3. a

Performance Check A: Tina was doing a population study of spiders. She used three different sets of experimental conditions, as shown below.

EXPERIMENTAL CONDITION	FOOD SUPPLY	EMIGRATION
I	limited	not allowed
II	unlimited	not allowed
III	limited	allowed

Four possible experimental results for each of these experiments are shown below.

EXPERIMENTAL RESULT	BIRTHRATE vs DEATH RATE
a	lower birthrate and equally low death rate
b	lower birthrate and a higher death rate
c	higher birthrate than death rate
d	a high birthrate which is equalled by the death rate

1. Based on the results of Dr. Emlen's experiments with mice, which of the experimental results (a, b, c, or d) shown above would you predict Tina will get for experiment I?
2. For experiment II?
3. For experiment III?

Remediation: (1) Review the student's answer to Self-Evaluation 7-3. (2) Review the student's answers to questions 2, 5, and 6 on pages 126 and 127 of Excursion 7-1.

Remembers the characteristics of planets suitable for human habitation.

The student applies the concepts governing the suitability of atmospheric conditions and temperature on a planet to be populated by humans without special support equipment.

Student Action: Responding negatively and in essence that a planet suitable for human habitation without special support equipment must have a temperature range between 0°C and 100°C if there is to be a possibility that liquid water is available and an atmosphere containing oxygen.

ES
O3
EXC
7-2

1

Performance Check A: Suppose that the following two new planets have been discovered.

PLANET	TEMPERATURE RANGE (in °C)	ATMOSPHERIC COMPOSITION
Farout	-5 to 65	nitrogen and carbon dioxide
Outasite	-90 to -15	oxygen and nitrogen

1. Would either of these planets be suitable for human habitation without support equipment?
2. Explain the reasons for your answer.

Remediation: (1) Have the student review points 1 and 2 listed on page 134. (2) Have him review Table 2 on page 131. If necessary, have him compare the conditions on earth with those on other planets.

ES O3 EXC 7-3 1

Predicts trends in family size from population curves.

The student applies the facts of the relationship of family size to the shapes of time versus population curves, assuming there is no change in the life span of the individual.

Student Action: Indicating the average family size which results in a particular graph in accordance with the following: a negative slope, showing a declining population, results from average families with fewer than two children; a zero slope (horizontal line), showing an almost constant population, results from average families of exactly two children; and a positive slope, showing an increasing population, results from average families having more than two children.

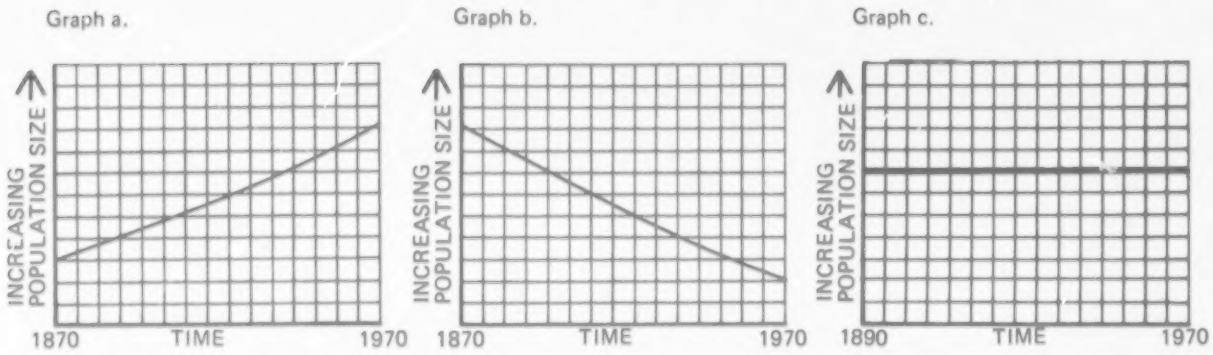
A: 1. b, 2. c, 3. a
B: 1. b, 2. a, 3. c
C: 1. c, 2. b, 3. a

Performance Check A: Each of the graphs below was drawn for the population of a different country. Match the appropriate graph to the approximate average family size in that country. Assume that no change in the life span of the individual occurred between 1870 and 1970.

Family Size

1. The average family had fewer than two children.
2. The average family had exactly two children.
3. The average family had more than two children.

Population Curve



Remediation: (1) Review the student's data in Table 1, page 138, his graphs of the data, and his answers to questions 1, 2, and 3. (2) Have him do an alternate performance check.

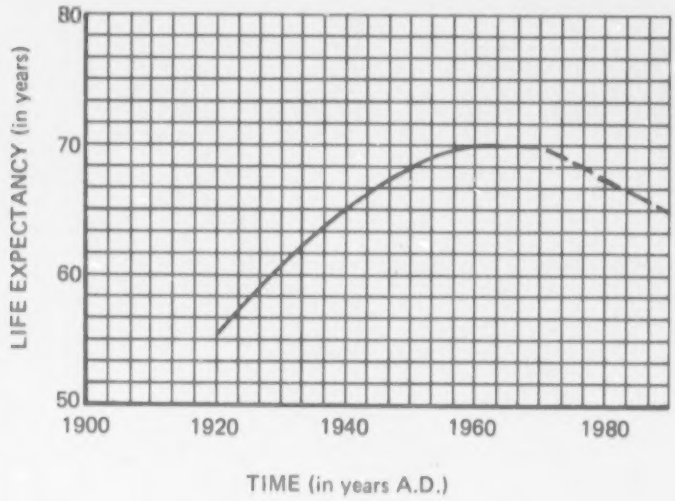
Gives possible reasons for a decline in life expectancy.

The student generates an explanation as to why some people might predict a decline in life expectancy during the next few decades.

Student Action: Stating an explanation that includes the essence of at least one of the following: (1) the effects of increased pollution, (2) increasingly crowded conditions facilitating the spread of diseases, or (3) crowded conditions resulting in increased violence (as they do in mice).

ES
O3
Exc
7-3
2

Performance Check A: The solid line on the graph below shows how human life expectancy has changed in the U.S. since 1920. The dotted line shows one prediction of how it will change during the next twenty years.



What could cause a decline in life expectancy during the next twenty years?

Remediation: (1) Have the student review Experiment C on page 126. Ask him to consider some of the conditions in the experiment and its results as applied to humans. (2) If interpreting graphs is a problem and an ISCS Level I or II text is available, have the student review Excursion 17 of Level I or Excursion 7-1, Part B, of Level II. (3) Ask him if increased population could outweigh our gains in technology so that, despite our best efforts, we would recreate the conditions described in the first paragraph of page 5.

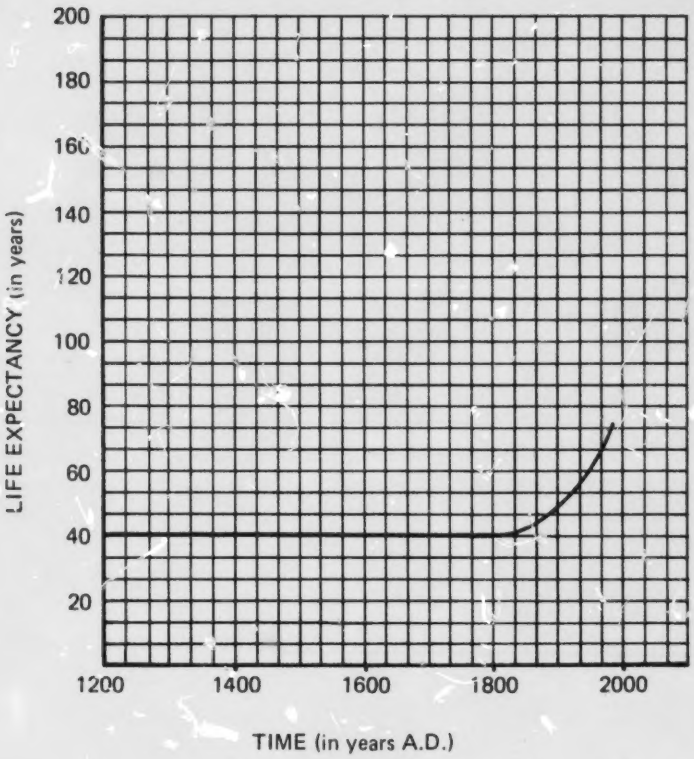
ES O3 EXC 7-3 3

Predicts data from a graph by extrapolating.

The student applies the concept of the uncertainty of predictions based upon extrapolation.

Student Action: Predicting a life expectancy and stating that his prediction is likely to be inaccurate because of the possible effects of unknown variables or changes in the relationship of known variables.

Performance Check A: The graph below shows how life expectancy has changed since 1200 A.D.



1. Use this graph to predict the life expectancy in 2100 A.D.
2. Explain why your prediction is likely to be inaccurate.

Remediation: (1) Review the student's answers to Self-Evaluations 7-3 and 7-6 to see if they reflect the notion that changing variables change the graph. (2) Review his answer to question 11 on page 140 of Excursion 7-3. Ask him if his estimate seems realistic to him. (3) If a Level II text is available refer him to Excursion 7-1 which develops the concept that extrapolation must be done with care because it is possible for the relationship between the variables to change.

Recognizes the effect of noise on hearing.

The student generates an explanation for temporary hearing reduction after leaving a noisy environment.

Student Action: Stating an explanation to the effect that the exposure to a noisy environment can result in a temporary reduction in hearing.

ES
O3
EXC
8-1

1

Performance Check A: Roy listens to the car radio every morning on his way to work at the carpentry shop. He leaves the radio switched on, and it comes on when he starts the car. Therefore, the volume is the same when he starts the car to go home after work as it was in the morning. He has noticed, however, that to hear the radio he has to turn the volume up after work and then turn it down again the next morning because it sounds too loud. Explain what might be causing this daily change in Roy's hearing.

Remediation: (1) Ask him to describe the noise level in the situation in the check. If he thinks it is quiet, have him list the activities in the situation to establish a more realistic estimate of the noise level or you might substitute a noisy situation which is more relevant to the student. (2) Have the student review pages 143 through 145. (3) Then, have him explain Figure 2 which relates noise, time, and hearing loss. (4) Ask the student to compare noise during sleep hours with noise during daytime hours and to explain the effects of eight hours of each on the ear, as diagramed in Figure 1. (5) Then have him review his response to the performance check.

ES O3 EXC 8-1 2

Selects the graph showing the relationship between hearing loss and age.

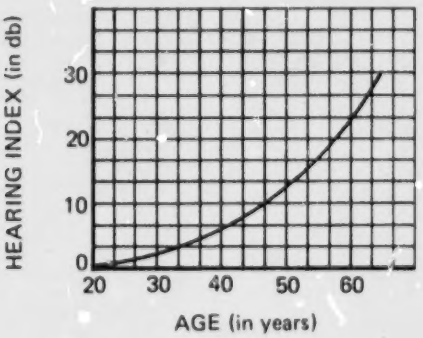
The student applies the facts that hearing loss usually begins in a person about age 25 and that the rate of loss increases with age.

Student Action: Selecting the graph which begins sloping upward about age 25 and continues sloping upward at an increasing rate with increasing age.

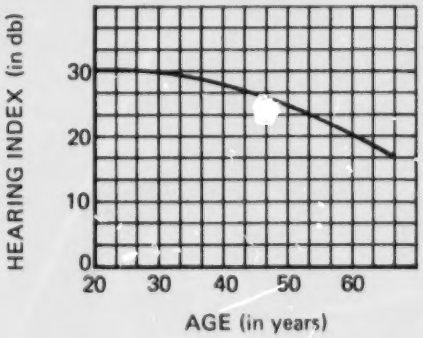
A: a
B: d
C: c

Performance Check A: Ralph wanted to measure how people's hearing changed with age. He measured the hearing index of a number of people. He operationally defined *hearing index* as the decibel level of the quietest sound that the person could hear. Which of the graphs below shows how the hearing index, as Ralph defined it, usually changes with age?

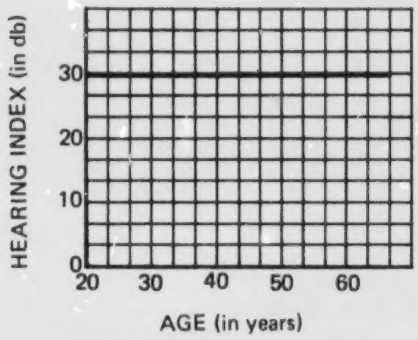
Graph a.



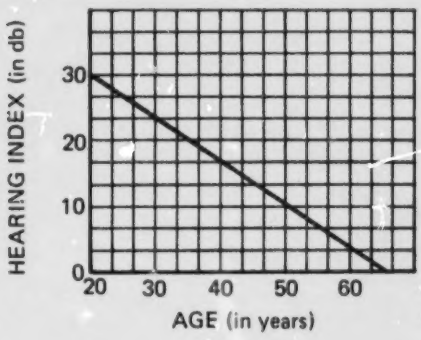
Graph b.



Graph c.



Graph d.



Remediation: (1) Have the student review the paragraph following question 9 on page 144. (2) If the interpretation of graphs is a problem and if an ISCS Level I or II text is available, have him do Excursion 17 of Level I or Excursion 7-1, Part B, of Level II. (3) If the texts are not available, help the student answer the following questions for each graph. What happens to a person's sense of hearing as he gets older? Does it happen faster or slower as he gets older?

Well-Being

WB

WB 01

Chapter 1

Excursions 1-1 thru 1-4

Performance Check

Summary Table

Objective Number	Objective Description
WB-01-Core-1	Defines *system*
WB-01-Core-2	Describes characteristics of a negative feedback system
WB-01-Core-3	Reads the set point from a graph
WB-01-Core-4	Selects the graph of temperature variation under the control of a thermostat
WB-01-Core-5	Predicts a result of thermostat breakdown
WB-01-Core-6	Calculates the number of calories required to change the temperature of water a stated amount
WB-01-Core-7	Defines *calorie* operationally
WB-01-Core-8	States the number of calories in a Calorie
WB-01-Core-9	Indicates what happens to food energy in the body
WB-01-Core-10	States ways to lose weight
WB-01-Core-11	Calculates the number of days required to gain or lose a specified amount of weight
WB-01-Core-12	Explains why a good diet plan includes different types of food
WB-01-Core-13	Cleans up the work area at the close of class
WB-01-Core-14	Cooperates with lab partners
WB-01-Core-15	Returns equipment promptly to storage areas
WB-01-Core-16	Responds to text questions
WB-01-Core-17	Shows care for laboratory materials

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						√				recalls	
									√	applies	
				Q						applies	
				Q						applies	
										applies	
				Q						applies	
						√				recalls	
				Q		√				recalls	
				Q		√				recalls	
						√				recalls	
				Q			√			applies	
						√				applies	
		O				√				chooses	
		O				√				chooses	
		O				√				chooses	
		O				√				chooses	
		O				√				chooses	

WB 01

Objective Number	Objective Description
WB 01-Exc 1-1-1	Selects a unit for measuring heat
WB-01-Exc 1-1-2	Selects the best interpretation of the results of the activity in Excursion 1-1
WB-01-Exc 1-1-3	Converts calories to Calories
WB-01-Exc 1-2-1	Selects a high Calorie food
WB-01-Exc 1-2-2	Relates the method of food preparation to Calorie content
WB-01-Exc 1-2-3	Explains the meaning of the phrase *well-balanced diet*
WB-01-Exc 1-3-1	Calculates the Calories used from an activity-Calorie-body weight chart

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
				Q		✓				recalls	
				Q						applies	
				Q		✓				applies	
				Q						applies	
				Q						applies	
										applies	
				Q			✓			applies	

WB 01 Core 1

Defines *system.*

The student recalls the definition that a system is a set of objects (components) that influence each other.

Student Action: Stating in effect that a system is several objects (components) that influence each other.

Performance Check A: A thermostat together with a furnace is referred to as a system. What is meant by the term *system*?

Remediation: (1) Have the student read the paragraph below question 1-10 on page 9. (2) If a Level I ISCS text is available, have him review the concept of systems on pages 8 and 9.

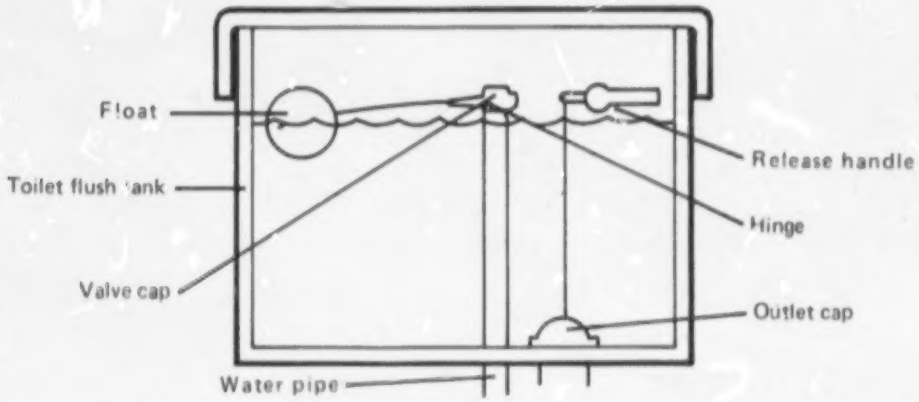
WB 01 Core 2

Describes characteristics of a negative feedback system.

The student applies the concept of how a negative feedback system works.

Student Action: Naming the stimuli and responses of the system and explaining in effect that the components influence each other in such a way that the response of the system to a stimulus is the opposite of the change produced by the stimulus.

Performance Check A: The toilet flush tank diagramed below can be thought of as a system.



When the release handle is pushed, the water rushes out of the flush tank. The float drops down, raising the valve cap and allowing water to flow up into the flush tank. The float rises, lowering the cap, until the cap stops the inflow of water completely.

1. Identify the stimuli and responses that make this a negative feedback system.
2. Explain why this is an example of a negative feedback system.

Remediation: (1) Have the student read from below question 1-10 on page 9 to the top of page 12. (2) Discuss Figures 1-5, 1-6, and 1-7 with the student. (3) Assess his definition of *negative feedback* by checking the answers to question 1-14 on page 12. (4) Have him check his answer to Self-Evaluation 1-8.

WB 01 Core 3

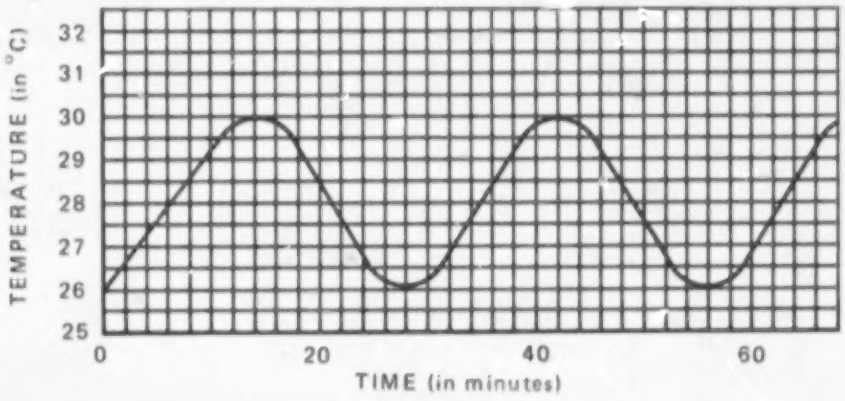
Reads the set point from a graph.

The student applies the concept that the set point is the midpoint between the maximum and minimum fluctuations of a negative feedback system.

Student Action: Reading the set point to within ±0.5°C of the midpoint between the maximum and minimum values.

A: 28 ±0.5°C
B: 33 ±0.5°C
C: 25 ±0.5°C

Performance Check A: Louis measured the temperature inside an incubator used to keep eggs warm before they hatch. He plotted the temperatures recorded in the incubator on the grid shown below.



At what temperature (set point) is the thermostat set to control the temperature of the incubator?

Remediation: (1) Refer the student to the last paragraph on page 8. (2) Refer him to the second paragraph on page 16. (3) Discuss the answer to question 1-9 with him. (4) Check his answer to question 1-25 and, if necessary, discuss it with him. (5) Check Self-Evaluation 1-1, parts a and b.

WB 01 Core 4

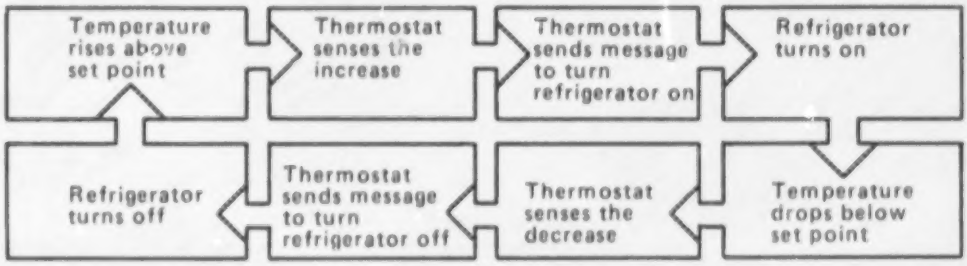
Selects the graph of temperature variation under the control of a thermostat.

The student applies the concept of the regular variation in a variable controlled by a negative feedback system.

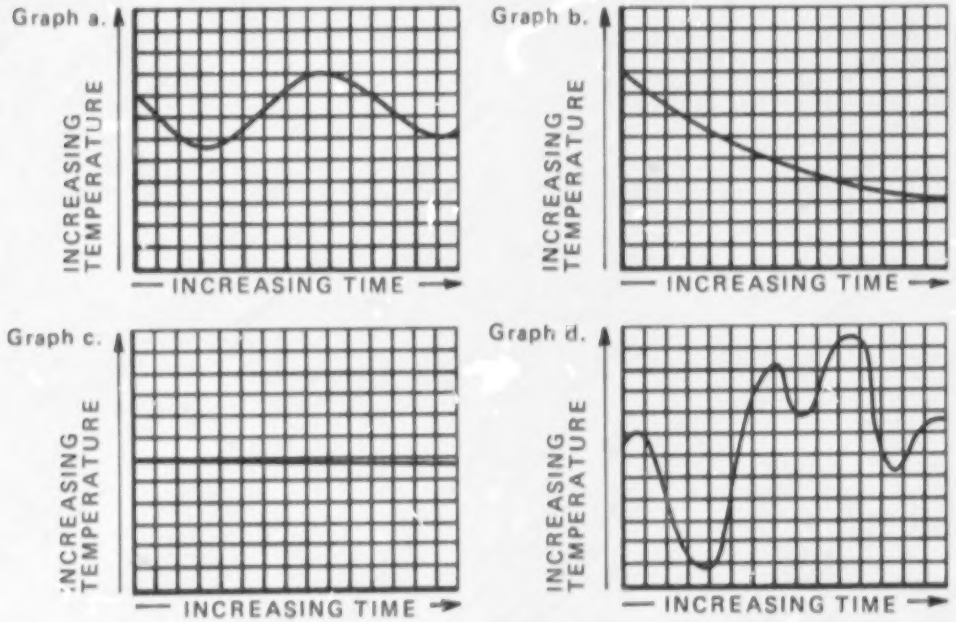
Student Action: Selecting the graph that shows the temperature fluctuating around a set point in a regular manner.

A: a
B: c
C: b

Performance Check A: The thermostat is used to regulate the temperature inside a refrigerator. The diagram below shows how the refrigerator-thermostat system works.


Temperature rises above set point
Thermostat senses the increase
Thermostat sends message to turn refrigerator on
Refrigerator turns on
Temperature drops below set point
Thermostat senses the decrease
Thermostat sends message to turn refrigerator off
Refrigerator turns off

Write the letter of the graph that best shows how the temperature changes inside a closed refrigerator.



Remediation: (1) Refer the student to the discussion following question 1-1 for a description of the system. (2) Refer him to Figure 1-2, page 9. (3) Discuss the graph in Figure 1-9. (4) Discuss the results of Problem Break 12 on page 16 if they are available. (5) Check the student's response to Self-Evaluation 1-1.

WB 01 Core 5

Predicts a result of thermostat breakdown.

The student applies the concept that the detector in a negative feedback system is necessary to detect changes in the variable being controlled so that the value of that variable does not get too large or too small.

Student Action: Stating in effect either that the room will get very hot because the thermostat does not turn the furnace off or that it will get cold because the thermostat does not turn the furnace on.

Performance Check A: Suppose that in January the thermostat that helps control the temperature in your classroom gets broken.

1. Predict one thing that might happen to the room temperature if this occurred.
2. Explain why it would happen.

Remediation: (1) Have the student study Figure 1-3 at the bottom of page 9, and Figure 1-4 on page 10. (2) If more help is required, the student may read from the middle of page 7 through Figure 1-5 on page 10.

WB 01 Core 6

Calculates the number of calories required to change the temperature of water a stated amount.

The student applies the formula

calories = mass of water (g) X change in temperature (°C).

to determine the number of calories required to raise the temperature of water a stated amount.

Student Action: Multiplying the mass of water in grams times the temperature change in °C and reporting his product as the number of calories.

A: 10,400 calories
B: 6,480 calories
C: 8,850 calories

Performance Check A: The formula used to calculate the amount of heat needed to change the temperature of water is

calories = mass of water (g) X change in temperature (°C).

How many calories of heat are required to raise the temperature of 650 grams of water from 22°C to 38°C?

Remediation: (1) Have the student check his answer to Self-Evaluation 1-4. (2) Have him review item number 4 in the Checkup on page 12. (3) He may need to review Excursion 1-1.

WB 01 Core 7

Defines *calorie* operationally.

The student recalls the operational definition of *calorie*.

Student Action: Stating in effect that a calorie is the amount of heat required to raise the temperature of one gram of water 1°C.

Performance Check A: Give an operational definition of *calorie*.

Remediation: (1) Find out if the student realizes that an operational definition answers two questions: How do I know I have some? (in this case by a rise in the temperature of water) and How can I tell how much I have? (here, by measuring the temperature change). (2) If a Level I ISCS text is available, refer him to page 22 for basic information on operational definitions. If the Level III text *Investigating Variations* is available, refer him to pages 6 and 7. (3) Have the student review his answer to item 3 in the Checkup on page 12. (4) Have him review the top paragraph on page 13 and identify the answers to the two questions answered by an operational definition. (5) It may be necessary to have him review Excursion 1-1. (6) Review his response to Self-Evaluation 1-2. If he confused *calorie* with *Calorie*, review his response to Self-Evaluation 1-3, Checkup question 2 on page 12, and the paragraphs below question 1-15.

WB 01 Core 8

States the number of calories in a Calorie.

The student recalls the relationship between calories and a Calorie.

Student Action: Stating that 1,000 calories equal 1 Calorie.

Performance Check A: How many calories equal 1 Calorie?

Remediation: (1) Have the student do question 2 in the Checkup on page 12. (2) If the question is not answered correctly, it may be necessary for him to review Excursion 1-1, page 95. (3) Review his answer to Self-Evaluation 1-3.

WB

Indicates what happens to food energy in the body.

The student recalls what happens to the energy in food that has been eaten.

Student Action: Selecting the answer which indicates that food energy can be (1) used to keep body temperature constant or (2) used to do work or (3) stored as fat.

A: c
B: e
C: d

01 Core 9

Performance Check A: Select the statement that best indicates what happens in the body to the energy in food which has been eaten.

a. All of the energy is used to keep the body at a constant temperature.
b. Some of the energy is used to keep the body warm, and the rest is used to do work.
c. The energy is used to keep the body temperature constant and to do work; any that is left over is stored as fat.
d. Most of the energy is used in doing work; the rest is used to keep the body at the correct temperature.
e. The energy is either used to do work or stored as fat that can be used as an energy source between meals.

Remediation: (1) Have the student review pages 14 through 18. (2) Check his answer to question 1-23 on page 15. (3) If he still fails to grasp the concept, discuss Figure 1-11, page 18.

States ways to lose weight.

The student recalls two ways to lose weight which do not include taking drugs.

WB 01 Core 10

Student Action: Responding, in effect, that he must decrease the amount of food energy received and increase the amount of work performed.

Performance Check A: Liz wants to lose some weight without taking drugs. What are two different ways she can do this?

Remediation: (1) Have the student review page 19 in the textbook. (2) Check the student's answer to question 1-32 on page 19. (3) Have the student review his answer to Self-Evaluation 1-5.

Calculates the number of days required to gain or lose a specified amount of weight.

The student applies the procedure for determining the length of time in days it takes for a person to gain (or to lose) a certain amount of weight.

WB 01

Core 11

Student Action: (1) Subtracting the number of Calories required each day from the food energy input to determine the difference, (2) dividing the product of the number of Calories per pound of stored fat times the number of pounds he wants to lose or gain by that difference, and (3) reporting the time in days accurately to within ±10%.

A: 35 ±4 days
B: 50 ±5 days
C: 56 ±6 days

Performance Check A: Susan wants to lose five pounds. She has adjusted her diet so that her food energy input is 1,500 Calories per day. Her body requires 2,100 Calories each day for doing work and for temperature control. How long will it take her to lose five pounds? Show all your work. (Note: A pound of body fat represents about 3,500 Calories of stored energy.)

Remediation: (1) Check the student's arithmetic procedure. (2) Have him review questions 1-32 through 1-34 on page 19.

WB 01 Core 12

Explains why a good diet plan includes different types of food.

The student applies the concept that nutrients such as vitamins, minerals, and proteins are just as important as the number of Calories in food.

Student Action: Stating in effect that a variety of food is suggested to ensure that the dieter receives enough nutrients such as vitamins, minerals, and proteins.

Performance Check A: Good diet plans suggest that a person who is trying to lose weight should eat a variety of different foods. The diet usually includes leafy vegetables, meats, yellow vegetables, and fruit. Why do good diet plans stress eating many different kinds of food, as well as decreasing the total food intake?

Remediation: (1) Review the student's answer to Self-Evaluation 1-6. (2) Have him review the last paragraph on page 22.

WB 01 Core 13

Cleans up the work area at the close of class.

The student chooses to close the laboratory activity period promptly upon receiving notification of the time to do so.

Student Action: Ceasing the ongoing laboratory activity when notified of the time, returning materials in usable, clean condition to storage, and participating in work area cleanup, on at least three separate occasions when being observed by the teacher without his knowledge.

Teacher's Note: The opportunity for assessment of this objective arises almost every day during the course of regularly assigned laboratory activities. Use a few minutes of class time for group instruction early in the school year, and almost every week for reinforcement, to discuss the role of the student in the ISCS learning environment. To encourage personal responsibility in the student, discuss the reasons for his closing his activities promptly (to allow time for himself and others for lab-closing activities), returning materials to storage in clean condition (to facilitate their use by others), and participating in area cleanups (to leave the area as clean as he found it).

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) If a student fails to accept this responsibility, approach him individually and review the reasons for his acceptance of it. Emphasize the social responsibility for cooperation in the learning environment for the good of all students. Point out that he has received the benefit of other students' provisions for others as well as for themselves. (2) Do not, at first, suggest that he may lose his privileges unless he cooperates. But if he doesn't cooperate after you observe his behavior several times, ask him if he can suggest a proper penalty. (3) An alternative remedy may be to request him to assist in the process of overall classroom accounting of the materials for a period of time until he recognizes the importance of the student's role. (4) Do not use extra cleanup as a penalty for not cleaning up properly. In other words, don't use something as a penalty that you want done willingly.

Cooperates with lab partners.

WB 01 Core 14

The student chooses to cooperate with fellow students in the laboratory.

Student Action: Being polite, waiting his turn, being orderly when moving about, and observing the right of classmates to work without being unnecessarily disturbed, when observed without his knowledge by the teacher or another designated person on at least three occasions.

Teacher's Note: The opportunity for assessment of this objective arises almost every day during the course of regularly assigned laboratory activities. Use a few minutes of class time at the beginning of a session for a whole-group discussion early in the school year and several times later on to discuss the need for cooperation with and consideration of other students. Some particular points for discussion include being polite, waiting patiently, not making others wait longer than necessary, being orderly when moving about, and observing the right of others not to be disturbed. Talk about each student's accepting the personal responsibility for his own behavior in the group situation.

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) If a student fails to accept any of these responsibilities, approach him privately and review the reasons for his lack of cooperation with fellow students. Suggest that he pay some attention to changing his behavior to more acceptable standards. (2) Find out if the student feels that he is behaving in a less than acceptable way. If so, ask him whether he feels some penalty should be imposed and what he thinks a suitable penalty would be.

WB 01 Core 15

Returns equipment promptly to storage areas.

The student chooses to show personal responsibility for returning laboratory equipment promptly to the proper storage places as soon as it is no longer needed, during the class period, and not just at the end of the period.

Student Action: Returning equipment and materials no longer needed to the proper storage places on at least three occasions when observed by the teacher or another designated observer without his knowledge of being checked.

Teacher's Note: This objective may be assessed at any time the student is responsible for learning activities requiring the use of equipment and supplies. Use a few minutes of class time for group discussion of the reasons for returning equipment to storage areas promptly when it is not being used by the student or by his group. The reasons include (1) the short supply of certain items and the need to cooperate with others, (2) the chances of equipment's being misplaced, (3) the possibility of accidental damage to equipment, and (4) the greater opportunity for pilferage by an irresponsible student when things are disorganized.

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: In a private conference, discuss the reasons for the student's cooperation in this request. Ask for that cooperation. See also Remediations (1), (2), and (3) for WB-01-Core-13.

WB 01 Core

Responds to text questions.

The student chooses to write in his *Record Book* the answers to 90% or more of the textbook questions.

Student Action: Exhibiting the written responses when requested to do so. At least nine out of ten questions should have responses, be they correct or incorrect.

16

Teacher's Note: It is intended that this objective be assessed throughout the year. Such a check provides opportunities to encourage students to work nearer their capacities while remaining independent of the teacher. Use a few minutes of class time for a group discussion of the reasons for writing the answers in the *Record Book*. Writing in the *Record Book* serves (1) to help the student think through what he sees and does, (2) to preserve ideas for future reference, (3) to make a record of the student's progress through the core, (4) to provide the teacher with a source of input for analyzing the student's difficulties and progress, and (5) to help the student learn the background ideas for conceptual understanding. Writing in the *Record Book* is "in"; writing in the text is "out."

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) In a private conference, discuss with the student the ideas enumerated and ask why he chooses not to write the answers. (Perhaps he cannot write!) Evaluate his reasons and counsel him accordingly. Encourage him to follow the pattern of classmates and set down his ideas as they are doing. (2) Have him read "Notes to the Student," pages viii and ix in his text. (3) Follow up in a few days to determine his actions.

WB 01 Core 17

Shows care for laboratory materials.

The student chooses to show proper care and use of ISCS laboratory materials.

Student Action: Using the materials only for their intended purpose or requesting permission to do other specific experiments with them when being observed without his knowledge by the teacher or another designated person on three or more occasions.

Teacher's Note: This objective may be assessed at any time that the student is responsible for a learning activity in which equipment and supplies are required. Use a few minutes of class time for a whole-group discussion of the reasons for handling laboratory materials properly. Such reasons include: (1) If damaged, they are lost to use by students who need them now. Short supply means waiting in line. (2) They cannot readily be replaced. Replacement usually takes several months at best. (3) If materials are handled properly, they may be used for other than regular activities (with the permission of the teacher and after making a proper request).

Performance Check A: Your teacher will observe you for this check when he can.

Remediation: (1) In a private conference, ask the student why he chooses to mishandle equipment. Help him to evaluate his reasons, and ask for his cooperation in the future. If he agrees, reassess the objective later. (2) If after the conference he still does not agree, ask him if he feels that he should be penalized and what he thinks should be an appropriate penalty. Give him another opportunity for compliance. (3) If he is still uncooperative, apply a penalty for mishandling equipment. This may mean denying him use of the equipment either temporarily or permanently or taking some other suitable action.

WB 01 Exc 1-1 1

Selects a unit for measuring heat.

The student recalls the calorie as a unit of heat measurement.

Student Action: Selecting *calorie*.

A: d
B: e
C: c

Performance Check A: Which of the following is used to measure units of heat energy?

a. degree
b. milliliter
c. newton
d. calorie
e. temperature

Remediation: (1) Review the student's answer to Self-Evaluation 1-2. (2) Have him review the first three paragraphs of Excursion 1-1 on page 95.

WB 01 Exc 1-1 2

Selects the best interpretation of the results of the activity in Excursion 1-1.

The student applies the concept that it is possible to make too broad an interpretation of experimental results.

Student Action: Selecting the choice which includes the idea that finding that a variable differs in two objects does not indicate that all objects differ in this variable.

A: d
B: c
C: b

Performance Check A: In Excursion 1-1, you found that a single burning peanut gave off more heat than five burning marshmallows. Select the best possible conclusion that you could draw from this activity.

a. All foods give off the same amount of heat energy when they are burned.
b. All foods contain different amounts of heat energy.
c. I cannot predict whether all foods give off different amounts of heat energy when burned because I tested only marshmallows and peanuts.
d. Other foods probably give off differing amounts of heat energy when burned, but I cannot be sure because I tested only peanuts and marshmallows.

Remediation: (1) Discuss with the student the results listed in Tables 1 and 2, on page 97 and 98 respectively. Try to stress the point of avoiding broad generalizations. (2) If ISCS Level II materials are available, have the student review Excursion 4-1, page 381, with particular emphasis on Part D on pages 388 through 390.

Converts calories to Calories.

WB 01 Exc 1-1 3

The student applies the relationship between calories and Calories to a specified example.

Student Action: Reporting an answer in Calories that is 1/1,000th of the number of calories specified.

A: 2.76 Calories
B: 8.54 Calories
C: 3.28 Calories

Performance Check A: Oscar performed an activity and found that three burning marshmallows released 2,760 calories. How many Calories is this?

Remediation: (1) Have the student check the definition of *Calorie* at the bottom of page 12. (2) Review his answer to question 4, Excursion 1-1, page 98.

Selects a high Calorie food.

WB 01 Exc 1-2 1

The student applies the concept that gram for gram, fats contain more Calories than either carbohydrates or proteins.

Student Action: Selecting the food that is mostly fat.

A: b
B: c
C: a

Performance Check A: Suppose you were trying to reduce the number of Calories you consumed. Which one of the following foods would you most want to avoid?

a. Corn, which is mostly starch
b. Roasted peanuts, which contain a lot of fats and oils
c. Fish, which is rich in proteins

Remediation: (1) Review the student's answer to question 2, page 99, of Excursion 1-2. (2) The student may want to look at the Calorie tables on pages 101 and 102.

Relates the method of food preparation to Calorie content.

WB 01 Exc

The student applies the concept that the method by which food is prepared affects the number of Calories it contains.

Student Action: Selecting the fried food and explaining in effect that of the three methods of preparation, frying uses the greatest amounts of fats and oils.

A: b
B: c
C: a

1-2
2

Performance Check A:

1. Potatoes may be prepared several ways. Which method of preparation gives you the largest number of Calories?
   a. Mashed potatoes
   b. French-fried potatoes
   c. Baked potatoes
   d. No difference
2. Explain your answer.

Remediation: (1) Have the student review number 1 on page 100. (2) Have him review page 99 and, if necessary, discuss with him the fact that frying adds fats (oils) to food. (3) Have the student explain the difference in the Caloric content of french fried and mashed potatoes in the chart on page 102. (4) Have him answer the question again.

WB
O1
Exc
1-2
3

Explains the meaning of the phrase *well-balanced diet.*

The student applies the concept that there is more to a good diet than just counting Calories.

Student Action: Responding negatively and to the effect that other things such as vitamins, minerals, and proteins, as well as calories, are important to a well-balanced diet.

Performance Check A: Dr. Cartney told a health class that it is very important to have a well-balanced diet.

1. Did he mean only that a person should count the Calories in the food he eats?
2. Explain your answer.

Remediation: (1) Review the student's answer to Self-Evaluation 1-6. (2) Have him review the last paragraph on page 22 and subparagraph 2 of paragraph 1 on page 100.

WB
O1
Exc
1-3

Calculates the Calories used from an activity-Calorie-body weight chart.

The student applies the procedure for calculating the total number of Calories used by a person in performing certain activities.

Student Action: Multiplying, for each activity, the time (in hours) by the number of Calories used per pound of body weight per hour by the body weight in pounds, then summing the Calories used for each activity to determine the total number of Calories used, and reporting the total number of Calories correctly within ±5%.

A: 182 ±9 Calories
B: 714 ±36 Calories
C: 476 ±24 Calories

Performance Check A: Michael has kept track of the amount of time he spent doing various activities. Part of his activity chart is shown below. What is the total number of Calories he used doing those activities? Show your work.

1

ACTIVITY	TIME (in hours)	CALORIES USED (per pound of body weight per hour)	BODY WEIGHT (in pounds)
Bicycling (slowly)	1	1.1	140
Eating	1	0.2	140

Remediation: Have the student review steps 1, 3, 4, and 5, listed on page 103 of the textbook and correct his response. (Step 2 should be omitted as the checks involve only selected activities and not the activities of an entire day.)

WB
02

Chapters 2 and 3

Excursions 2-1 thru 2-3

Performance Check

Summary Table

Objective Number	Objective Description
WB-02-Core-1	Explains why a control is necessary in an experiment
WB-02-Core-2	Lists substances found in cigarette smoke
WB-02-Core-3	Matches appearances of windpipe tissue with the amount of smoking
WB-02-Core-4	Selects an effect that smoking does not have on the body
WB-02-Core-5	States whether variables which increase together show a cause and effect relationship
WB-02-Core-6	Selects the incorrect statement about the death rate of smokers
WB-02-Core-7	Defines *physical dependence* operationally
WB-02-Core-8	Defines *psychological dependence* operationally
WB-02-Core-9	Distinguishes between physical and psychological drug dependence
WB-02-Core-10	States why pregnant women should not use certain drugs
WB-02-Core-11	Diagrams and labels a negative feedback system
WB-02-Core-12	Lists ways that messages are sent in the human body
WB-02-Core-13	Explains the difference between drug use and drug abuse
WB-02-Exc 2-1-1	Arranges plant and animal parts in order of increasing complexity
WB-02-Exc 2-1-2	States why most plants and animals need more than one kind of cell
WB-02-Exc 2-2-1	Lists three advantages of an interview over a written questionnaire
WB-02-Exc 2-2-2	Explains why interviewers must be trained
WB-02-Exc 2-2-3	States the advantages of questionnaires over interviews

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
										applies	
										recalls	
				Q		✓				recalls	
				Q		✓				recalls	
										applies	
				Q		✓				recalls	
						✓				recalls	
						✓				recalls	
				Q		✓				applies	
						✓				generates	
					T				✓	applies	
									✓	recalls	
						✓				generates	
				Q						recalls	
										recalls	
						✓				recalls	
										applies	
										recalls	

WB 02

Objective Number	Objective Description
WB-02-Exc 2-2-4	Improves the construction of a questionnaire
WB-02-Exc 2-3-1	Names the organs and kinds of blood vessels in the human circulatory system
WB-02-Exc 2-3-2	Traces the path of blood flow through the human body
WB-02-Exc 2-3-3	States two reasons why red blood cells are important
WB-01-Core-1R	Defines *system*
WB-01-Core-2R	Describes characteristics of a negative feedback system

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
					T	✓				applies	
				Q						identifies	
				Q				✓		recalls	
										recalls	
						✓				recalls	
						✓				applies	

WB O2 Core 1

Explains why a control is necessary in an experiment.

The student applies the concept of including a control in most experiments.

Student Action: Responding either to the effect that controls are necessary to determine whether the observed effect is associated with the experimental variables or would occur anyway or with an example of another variable which could have affected the results.

Performance Check A: When you investigated the effect of the cigarette-smoke solution on the germination of corn seeds, you were asked to set up a control. Why are controls necessary in such activities?

Remediation: (1) Have the student review his answer to Self-Evaluation 2-1. (2) If an ISCS Level II text is available, have the student review Excursion 4-1, "Controlled Variables and Experimental Variables," on pages 381 through 390.

WB O2 Core 2

Lists substances found in cigarette smoke.

The student recalls the chemicals or chemical substances found in cigarette smoke.

Student Action: Listing three chemicals or substances from the following list: (1) nicotine, (2) cancer-producing substances, (3) irritants, (4) carbon monoxide, and (5) arsenic.

Performance Check A: List three different chemicals or types of chemicals that are found in cigarette smoke.

Remediation: Have the student look at Table 2-1 on page 30.

WB O2 Core 3

Matches appearances of windpipe tissue with the amount of smoking.

The student recalls that the amount of damage to the epithelium of a person's windpipe is proportional to the amount he smokes.

Student Action: Matching the thin wall epithelium with the nonsmokers, the thicker wall with the moderate smoker, and the thickest wall with the heavy smoker.

A: 1. a, 2. b, 3. c
B: 1. b, 2. c, 3. a
C: 1. c, 2. a, 3. b

Performance Check A: The diagrams below show the epithelial tissue from the windpipes of three different people. One person is a heavy smoker, one smokes a moderate amount, and one is a nonsmoker. Match the letters of the proper diagrams below with the numbers of the labels.

Types of Smokers

1. Nonsmoker
2. Heavy smoker
3. Moderate smoker

Diagrams of Tissue

Diagram a.

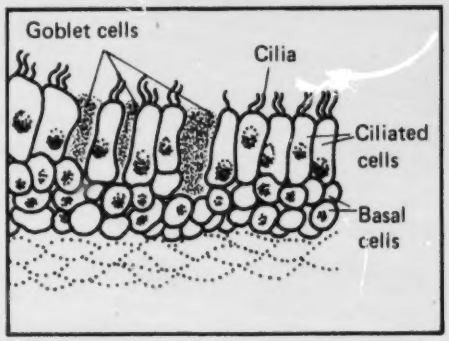


Diagram b.

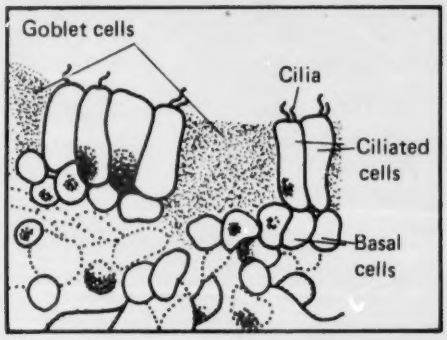
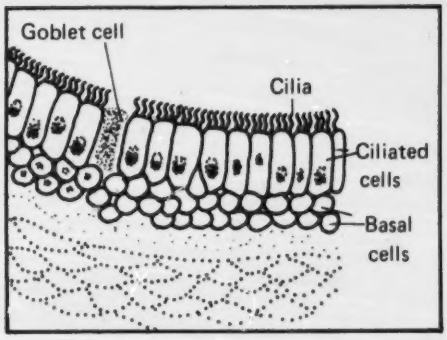


Diagram c.



Remediation: (1) Check the student's answer to Self-Evaluation 2-2. (2) Have him read from the middle of page 28 through the bottom of page 31. (3) If necessary, discuss the cells' features in each one of the three diagrams and their resemblance to healthy cells from nonsmokers.

Selects an effect that smoking does not have on the body.

The student recalls the effects that smoking has on the body.

WB

O2 Core 4

Student Action: Selecting the effect which contradicts one of those listed below:

1. It causes the epithelium of the windpipe to become thicker and contain more and larger goblet cells.
2. It reduces the number and activity of the cilia in the epithelium of the windpipe.
3. It increases the mucus and the chances of having a cough or other respiratory problems.
4. It causes a loss in the control of cell production in the epithelium.
5. It tends to break down the walls of the air sacs in the lungs.
6. It increases the heartbeat rate.
7. It increases the breathing rate.

A: c
B: a
C: e

Performance Check A: Which of the following is not an effect that smoking has on the body?

a. It reduces the number and activity of the cilia in the epithelium of the windpipe.
b. It increases the mucus and the chances of having a cough or other respiratory problems.
c. It reduces the breathing rate.
d. It tends to break down the walls of the air sacs in the lungs.
e. It increases the heartbeat rate.

Remediation: (1) Have the student review the material from the middle of page 28 to the bottom of page 35. (2) He may need to check his answers to Self-Evaluation 2-5, a and b.

WB O2 Core 5

States whether variables which increase together show a cause and effect relationship.

The student applies the concept that two variables varying together does not mean that there is a cause and effect relationship between them.

Student Action: Responding negatively and to the effect that the fact that two variables increase or decrease together does not prove that changes in one cause change in the other, since unknown or uncontrolled variables may also be involved.

Performance Check A: Throughout the late fall and early winter, John counted the number of people who wore scarves to school and the number of people who had colds. He found that as the number of people wearing scarves increased, the number of people with colds also increased.

1. Do these data prove that wearing a scarf increases the chances of catching a cold?
2. Explain your answer.

Remediation: (1) Have the student check his answer to Self-Evaluation 2-3. (2) He might also check his response to question 2-18 on page 39. (3) He may find it helpful to look at Problem Break 2-5 on page 41. (4) Ask him to identify possible causes in common for the increase in both variables.

WB O2 Core 6

Selects the incorrect statement about the death rate of smokers.

The student recalls that the death rate due to lung and respiratory diseases varies with the amount an individual smokes.

Student Action: Selecting the statement which disagrees with one of the following: (1) the death rate due to lung cancer increases the more a person smokes, (2) smoking increases the chances of dying from a number of diseases such as bronchitis and emphysema, (3) cancer of the voice box, mouth, and throat increase with increased smoking, (4) the death rate increases the more a smoker inhales, and (5) the death rate decreases slowly for people who stop smoking.

A: c
B: d
C: b

Performance Check A: The following statements refer to the death rate among people who smoke. Indicate which of these statements is not correct.

a. People who smoke are more likely to die of lung cancer than nonsmokers.
b. Smokers who inhale deeply have a higher death rate than people who smoke but do not inhale.
c. The death rate for people who stop smoking is just as high as the death rate for those who keep smoking.
d. The death rate for people who smoke fewer cigarettes a day is lower than the rate for those who smoke many.

Remediation: (1) Have the student review pages 40 through 46. (2) Refer him to Figure 2-14 on page 43 and to Figure 2-16 on page 46. (3) Review his answer to question 2-26 on page 46.

WB O2 Core 7

Define *physical dependence* operationally.

The student recalls an operational definition for *physical dependence*.

Student Action: Stating, in effect, that physical dependence is indicated by the withdrawal reaction to stopping the use of a drug and the amount of dependence is measured by the extent of the withdrawal reaction.

Performance Check A: Some people are said to have a physical dependence on tobacco. Give an operational definition for *physical dependence*.

Remediation: (1) Have the student check his answer to question 3-2 on page 50. (2) He should also check his answer to Self-Evaluation 3-1. (3) Have him cite two other examples of physical dependence.

WB 02 Core 8

Defines *psychological dependence* operationally.

The student recalls the operational definition for *psychological dependence.*

Student Action: Stating, in effect, that psychological dependence is indicated by a mental craving for something when there is no physical need for it and is measured by the extent of the craving.

Performance Check A: State an operational definition for *psychological dependence.*

Remediation: (1) Have the student check his answer to question 3-3 on page 51 of the textbook. (2) Check his answer to Self-Evaluation 3-2. (3) He may need to review page 51.

WB 02 Core 9

Distinguishes between physical and psychological drug dependence.

The student applies the concepts of physical drug dependence and psychological drug dependence.

Student Action: Stating the type of dependence correctly in both cases and the notion that a person is physically dependent on a drug if he would suffer a withdrawal illness when he stopped using the drug and a person is psychologically dependent on a drug if he has a mental craving for it but his body does not require it for normal functioning.

A: 1. psychological, 2. physical
B: 1. psychological, 2. physical
C: 1. physical, 2. psychological

Performance Check A: In each of the following situations
(a) indicate whether the person described is physically or psychologically dependent on the drug and
(b) explain your answer.

Situation 1. Ruth tried a new brand of cough syrup last year when she had a severe cold. She told friends, "It makes me feel great." Now, she almost looks forward to catching a cold so that she has an excuse for taking some more of that cough syrup.

Situation 2. Barbara had problems with a runny nose. She found that a nasal spray helped. She used it for four months. Then, she found that if she didn't spray her nose, it would run worse than ever.

Remediation: (1) Have the student check his answer to question 3-4 on page 51. (2) If necessary, review the remediation for WB-02-Core-7 and WB-02-Core-8 with the student. (3) Review the responses to Self-Evaluations 3-1 and 3-2 with him. (4) Then have him give an example of each type of dependence.

States why pregnant women should not use certain drugs.

WB 02 Core 10

The student generates an explanation for why pregnant women are often advised by their physicians not to use a certain drug until after their babies are born.

Student Action: Stating an explanation that expresses the idea either that the drug may effect the unborn infant by causing the child to become physically dependent on the drug or that the drug may affect the child's development.

Performance Check A: Mrs. Jones is pregnant. Her doctor advised her to stop using antibiotics to control a rash on her face until after the baby is born. Explain why the doctor is concerned about the drugs Mrs. Jones takes while she is pregnant.

Remediation: (1) Review the student's answer to Self-Evaluation 3-6. (2) Discuss the first paragraph on page 51 with him.

Diagrams and labels a negative feedback system.

WB 02 Core 11

The student applies the concept of a negative feedback system.

Student Action: Diagraming and labeling a negative feedback system which includes at least one detecting mechanism, a message component, and a controlling component, all of which interact in such a way that when a stimulus is imposed on the system, the system reacts to counteract the effect of the stimulus.

Performance Check A: Ronald took a drug that seemed to affect his sense of balance. He could not stand up straight, but would lose his balance and fall. Diagram and label a possible negative feedback system that might no longer be working because of this drug.

Remediation: (1) Have the student review Figure 3-1 on page 53. (2) If the concept of negative feedback is not clear, have the student review his answers to question 1-24 and questions 1-27 through 1-30, pages 15 through 18. (3) Perhaps it would be helpful for you to identify each component listed in the Student Action in Figure 1-3 on page 9.

Lists ways that messages are sent in the human body.

WB 02 Core

The student recalls that there are two different ways of sending messages in the human body.

Student Action: Stating in effect that the human body can send messages chemically and electrically.

Performance Check A: What are two different ways that messages are sent in the human body?

12

Remediation: (1) Have the student check his answer to question 3-7 on page 54. (2) Review points 1 through 4 on page 53 and the upper two-thirds of page 54 with him. (3) Then check to see if the student knows what body parts carry messages through the body. Perhaps identifying the parts with their functions will help him visualize such messages being sent. (4) Have him study Table 1 on page 110 to help him associate the notion of electrical impulses traveling by means of the nerves.

WB O2 Core 13

Explains the difference between drug use and drug abuse.

The student generates an explanation of the difference between drug use and drug abuse.

Student Action: Stating an explanation to the effect that drug abuse refers to using drugs unnecessarily or without or beyond medically recommended dosages, whereas drug use refers to using drugs within medically recommended limits to aid one's health or welfare.

Performance Check A: Many people are becoming concerned about increasing drug abuse. Explain the difference between drug use and drug abuse.

Remediation: (1) Have the student review the section "Good Drugs and Bad Drugs" on pages 54 and 55. (2) Discuss this section as it applies to the question. (3) Have the student look ahead at the third columns of Table 4-1, page 58, and Table 5-1, page 68, if he needs to be made aware of the positive effects of the wise use of some often abused drugs.

WB O2 Exc 2-1 1

Arranges plant and animal parts in order of increasing complexity.

The student recalls that a cell is the simplest unit, a tissue is composed of many cells, an organ is composed of several different types of tissues, and an organ system is made up of several organs.

Student Action: Listing the words in the following order: cell, tissue, organ, and organ system.

Performance Check A: Many plants and animals are made up of the parts listed below. Arrange these parts in order from the simplest to the most complex.

1. Organ
2. Cell
3. Organ system
4. Tissue

Remediation: Have the student review pages 110 and 111 in *Well-Being*.

States why most plants and animals need more than one kind of cell.

The student recalls that it is necessary for most plants and animals to have more than one kind of cell.

Student Action: Responding in effect that cells in different parts of the plant or animal must do different things.

Performance Check A: Why is it necessary for most plants and animals to be composed of many different kinds of cells instead of just one kind of cell?

Remediation: Have the student review the first paragraph on page 110.

WB O2 EXC 2-1 2

Lists three advantages of an interview over a written questionnaire.

The student recalls the advantages of an interview over a written questionnaire.

Student Action: Listing three advantages, at least two of which are in agreement with the following: (1) sometimes people will talk more than they will write, (2) movements, looks, or tones of voice may give clues about what a person is really thinking, and (3) in an interview, a person can be asked to make a point clear or to give more information.

Performance Check A: List three advantages of interviews over written questionnaires.

Remediation: (1) Have the student review the list of advantages on page 113. (2) Have him redo the check.

WB O2 EXC 2-2 1

Explains why interviewers must be trained.

The student applies the concept of controlling variables in data gathering.

Student Action: Stating, in effect, that in any experiment it is necessary to control all extraneous variables that might affect the results.

Performance Check A: The companies that take surveys of public opinion usually spend a great deal of money training their interviewers. In each series of interviews, the interviewers are expected to ask exactly the same questions, using exactly the same tone of voice. Why is this training important?

WB O2 EXC 2-2 2

Remediation: (1) For general help, have the student read the last paragraph on page 113. (2) Check his response to question 1, page 114. (3) If the ISCS Level II materials are available, more detailed help can be found in Excursion 4-1, page 381, of Level II. (4) Ask him if the question, "Do you smoke?" means the same when asked neutrally as when asked in a threatening tone.

WB O2 Exc 2-2 3

States the advantages of questionnaires over interviews.

The student recalls the advantages of using written questionnaires rather than personal interviews when conducting research.

Student Action: Responding either to the effect that larger numbers of people can be reached more quickly and more cheaply using a questionnaire or with any other advantage that he can defend.

Performance Check A: Many surveys use written questionnaires rather than personal interviews, despite the advantages of an interview. What are several advantages of using a written questionnaire?

Remediation: (1) Refer the student to the next to last paragraph on page 114. (2) Ask the student which type of data collecting, interview or questionnaire, would probably be less expensive.

WB O2 Exc 2-2 4

Improves the construction of a questionnaire.

The student applies the concepts of good questionnaire construction.

Student Action: Improving the questions so that they are in agreement with at least three of the following four concepts:

1. an anonymous questionnaire is more likely to be answered and provides a better measure of a person's feelings than one which is signed,
2. the questions should use clear and simple language so that words and ideas cannot be misunderstood,
3. the questions should never indicate the preferred answer, and
4. multiple-choice questions should provide an unambiguous response for every possible type of respondent.

Performance Check A: Arthur wanted to do a survey to determine student attitudes toward drinking alcohol. The first part of his questionnaire is shown below.

SURVEY OF STUDENT ATTITUDES TOWARDS ALCOHOL
1. What is your name?
2. What is your age?
   [ ] 10 - 15 years old
   [ ] 18 - 21 years old
   [ ] 21 years old or older
3. You don't drink alcohol, do you?
   [ ] yes
   [ ] no
4. Do you think that people who drink are very bad?
   [ ] yes
   [ ] no

Improve this questionnaire by rewriting it and making at least three changes.

Remediation: (1) Have the student review pages 114 through 118 in the textbook, especially the rules for making and using questionnaires. (2) Then have him redo his check with an open book.

Names the organs and kinds of blood vessels in the human circulatory system.

The student identifies the major parts of the human circulatory system.

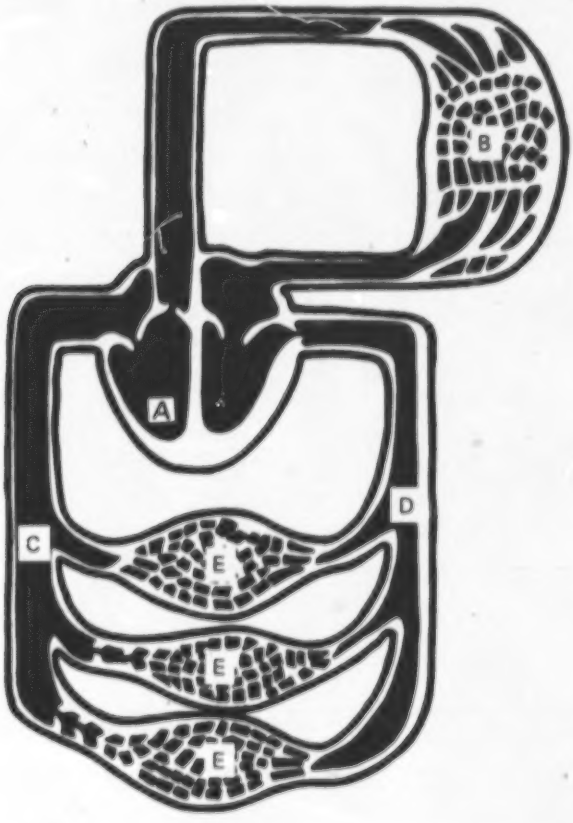
Student Action: Naming correctly the heart, lungs, veins, arteries, and capillaries.

A: 1. A. heart, B. lung, 2. C. vein, D. artery, E. capillaries
B: 1. A. lung, B. heart, 2. C. vein, D. capillaries, E. artery
C: 1. A. lung, 2. B. artery, C. capillaries, D. vein, E. heart

WB
O2
EXC
2-3
1

Performance Check A: The diagram below represents the human circulatory system.

1. Name the organs indicated by letters A and B.
2. Name the kinds of blood vessels indicated by letters C, D, and E.



Remediation: (1) Have the student refer to Figure 4 on page 124. (2) Review his answers to questions 4, 5, and 6 on page 124.

WB
O2
Exc
2-3

Traces the path of blood flow through the human body.

The student recalls the general pattern of blood flow through the human circulatory system.

Student Action: Listing the letters that correspond to the following sequence of parts beginning with the part initially indicated: blood flows from the veins (D) to the left auricle of the heart (M), to the left ventricle (B), to the pulmonary arteries (K), to the lungs (T), to the right auricle (R), to the right ventricle (F), to the arteries (G), to the capillaries of the body (A), and back to the veins (D).

A: M, B, K, T, R, F, G, A, D, M
B: D, M, B, K, T, R, F, G, A, D
C: G, A, D, M, B, K, T, R, F, G

Performance Check A: The diagram below represents the human circulatory system. Indicate the path that blood flows through the body by listing, in order, the letters that correspond to the various parts. Start and finish with the part labeled M.

2

Remediation: Have the student review Figure 4 on page 124.

States two reasons why red blood cells are important.

The student recalls the function of red blood cells.

Student Action: Responding, in effect, that red blood cells carry oxygen from the lungs to the rest of the body cells and carry carbon dioxide from the body cells to the lungs.

WB
O2

Exc
2-3
3

Performance Check A: State two things that the red blood cells do which make them important to the functioning of the body.

Remediation: (1) Have the student review page 125. (2) You may want to discuss this question as it relates to Figure 4, page 124. (3) If the student equates blood and red blood cells, stress the point that red blood cells are just one of the components of the blood, and that the functions of the blood as a whole or its other components cannot be attributed to red blood cells.

WB
03

Chapters 4 thru 6

Excursions 5-1 thru 5-4

Performance Check

Summary Table

Objective Number	Objective Description
WB-03-Core-1	Defines *depressant*
WB-03-Core-2	States the effects of depressants
WB-03-Core-3	Selects purposes for which physicians prescribe depressants
WB-03-Core-4	Uses the relationship between alcohol and reaction time
WB-03-Core-5	Explains why the blood-alcohol level test may be unfair
WB-03-Core-6	Predicts the possible effects of combining drugs
WB-03-Core-7	Selects useful properties of stimulants
WB-03-Core-8	Selects effects of stimulants
WB-03-Core-9	Explains the effect of stimulants
WB-03-Core-10	Explains the phrase *developing a tolerance to a drug*
WB-03-Core-11	Matches hallucinogenic drugs with their sources
WB-03-Core-12	Judges the appropriateness of an operational definition
WB-03-Core-13	Predicts whether hallucinogens will affect everyone the same way
WB-03-Core-14	Lists common undesirable effects of a hallucinogen
WB-03-Core-15	Decides whether hallucinogens affect everyone the same way
WB-03-Core-16	Defines *placebo*
WB-03-Core-17	Explains why placebos are used
WB-03-Core-18	Defines *double-blind experiment* and explains the reason for its use

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
						√				recalls	
						√				recalls	
				Q		√				recalls	
							√			applies	
					T				√	applies	
						√				applies	
				Q		√				recalls	
				Q		√				recalls	
						√				recalls	
						√				recalls	
				Q						recalls	
						√				applies	
						√				applies	
						√				recalls	
						√				applies	
										recalls	
										recalls	
										recalls	

WB 03

Objective Number	Objective Description
WB-03-Core-19	Recognizes the characteristics of a double-blind experiment
WB-03-Core-20	States two reasons why laws are passed
WB-03-Core-21	States the third reason for passing a law
WB-03-Exc 5-1-1	Selects examples of illusions, delusions, and hallucinations
WB-03-Exc 5-2-1	Explains the DSST as an operational definition for an entity
WB-03-Exc 5-3-1	Distinguishes between the social effects of alcohol and marijuana
WB-01-Core-1R	Defines *system*
WB-01-Core-2R	Describes characteristics of a negative feedback system
WB-02-Core-7R	Defines *physical dependence* operationally
WB-02-Core-8R	Defines *psychological dependence* operationally
WB-02-Core-9R	Distinguishes between physical and psychological drug dependence

	Materials	Observer	Special Preparations	Quick Score	3 + Minutes	Basal	Math	Reading	Concept	Action Verbs	Notes
										applies	
										classifies	
										generates	
				Q					√	classifies	
										applies	
										applies	
						√				recalls	
						√				applies	
						√				recalls	
						√				recalls	
				Q		√				applies	

WB O3 Core 1

Defines *depressant.*

The student recalls the definition of *depressant.*

Student Action: Stating, in effect, that depressants are chemicals used to slow down the rate of functioning of the body.

Performance Check A: Some people take drugs that are depressants. Define *depressant.*

Remediation: (1) Check the student's answer to Self-Evaluation 4-1. (2) Refer him to pages 58 through 65. Emphasize that the effects of alcohol are the effects of slowing down the reactions of the body.

WB O3 Core 2

States the effects of depressants.

The student recalls symptoms experienced by a person who has taken a depressant.

Student Action: Listing at least two of the following symptoms: slower breathing, slower reaction rates, slurred speech, difficulty in concentrating, decreased coordination, slower heartbeat, lower blood pressure, and poor emotional control.

Performance Check A: Suppose a person has taken a depressant. List two effects of the drug that you might notice in the person.

Remediation: (1) Check the student's answer to Self-Evaluation 4-1. (2) Refer him to the second paragraph on page 59. (3) Discuss that paragraph if necessary. (4) Many of the complications listed for barbituates on page 141 are symptoms; have the student review them.

WB O3 Core 3

Selects purposes for which physicians prescribe depressants.

The student recalls helpful effects of depressants which might cause a physician to prescribe them.

Student Action: Selecting any two of the three effects appearing in the check, taken from the following list:

1. to relieve severe pain due to heart failure, heart attack, or cancer,
2. to reduce a tendency to cough,
3. to prevent epileptic seizures,
4. to reduce restlessness, and
5. to lower high blood pressure.

A: a, b, e
B: b, d, e
C: a, c, d

Performance Check A: Physicians often use depressants to treat people who are sick. Select the helpful effects of depressants which might cause a physician to prescribe them.

a. To prevent epileptic seizures
b. To relieve the pain from cancer
c. To help a person react faster
d. To increase alertness
e. To reduce the tendency to cough

Remediation: (1) Check the student's answer to Self-Evaluation 4-4. (2) Refer him to Table 4-1 on page 58 and to the paragraph above the table.

WB O3 Core 4

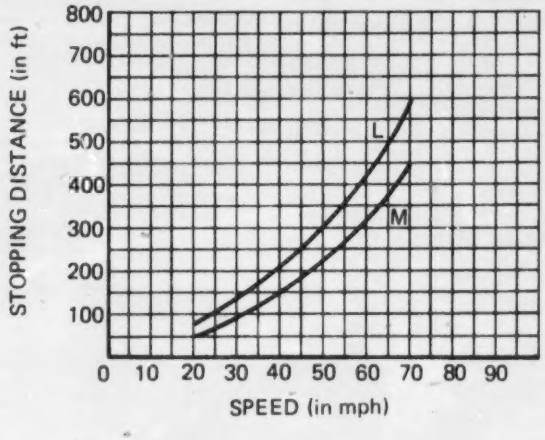
Uses the relationship between alcohol and reaction time.

The student applies the concept of the effects of alcohol on a person's reaction time.

Student Action: Selecting the graph showing the greater stopping distance and stating in effect that alcohol dulls the senses and increases a person's reaction time.

A: Curve L
B: Curve X
C: Curve A

Performance Check A: The graph below shows the distance required to stop a car at different speeds. One line shows the stopping distances for the same driver after he has been drinking.



1. Which curve represents the stopping distances after the driver has been drinking?
2. Explain why the driver has different stopping-distance curves before and after drinking.

Remediation: (1) Refer the student to pages 61 and 62 of the text with emphasis on Figure 4-1. (2) Ask him if he can graph the data indicated by the white and red bars in Figure 4-1. If the student graphs these data, he may be better able to see the relationship. The graphs in checks B and C represent a person who has been drinking more than the person in Figure 4-1, hence the greater variation in stopping distance from the nondrinking driver.

WB O3 Core 5

Explains why the blood-alcohol level test may be unfair.

The student applies the concepts that individuals react differently to the same amounts of alcohol and that measurements should be appropriate to the variables they measure.

Student Action: Stating, in effect, that the same level of alcohol in the blood will produce different effects in different individuals, and that it would be fairer instead to test a response such as reaction time, which is more closely related to driving ability.

Performance Check A: Most police departments use a blood-alcohol level test. It tells whether a driver who has been drinking should be charged with drunken driving. Some people have suggested that testing the drinking driver's reaction time would be a better test.

1. Why is the blood-alcohol test not always fair?
2. Why might testing a driver's reaction time be fairer?

Remediation: (1) Refer the student to the paragraph below Figure 4-4, page 64. (2) The student may profit by studying the data in Table 4-3, page 64. (3) Check his answer to question 4-8, page 65. (4) Have him review Self-Evaluation 4-3.

WB O3 Core 6

Predicts the possible effects of combining drugs.

The student applies the concept that often combinations of drugs have a greater effect than the individual drugs taken separately.

Student Action: Stating, in effect, that the person who took both drugs is likely to be affected most and that one drug may increase the effect of another so that their total effect may be much greater than the effect of either one alone.

A: Person 3
B: Person 1
C: Person 2

Performance Check A: Three different people, all about the same size, took the drugs listed below.

Person 1	2 oz whiskey
Person 2	2 sleeping pills
Person 3	1 oz whiskey and 1 sleeping pill

1. Which person is likely to be affected most by these drugs?
2. Explain the reason for your answer.

Remediation: (1) Check the student's answer to Self-Evaluation 4-7. (2) Refer him to the paragraphs following question 4-8 on page 65.

Selects useful properties of stimulants.

WB O3 Core 7

The student recalls the useful properties of stimulants prescribed by a doctor.

Student Action: Selecting the two of the three following properties included in the list of options: reducing the appetites of overweight people, relieving severe pain, and reducing drowsiness.

A: b, c
B: a, d
C: c, e

Performance Check A: Indicate which of the items in the list below are useful properties of a stimulant prescribed by a doctor.

a. Relaxes people who tend to be nervous
b. Relieves severe pain
c. Reduces the appetite
d. Helps people get to sleep and have a good rest
e. Helps cure an upset stomach

Remediation: (1) Refer the student to Table 5-1 on page 68. (2) Suggest that the student read the last paragraph on page 67.

Selects effects of stimulants.

WB O3 Core

The student recalls the effects of stimulants on the body.

Student Action: Selecting at least two of the effects of stimulants, as listed, that appear in the check: increasing heartbeat or breathing rate; producing psychological changes such as nervousness, irritability, tension, and anxiety; making it difficult to sleep; increasing aggressive and unpredictable behavior; reducing the appetite; and causing the body to use up energy reserves, thereby leading to sudden exhaustion or collapse.

A: a, d, e
B: b, c, d
C: a, c, e

8

Performance Check A: Stimulants can cause physical and psychological changes in a person who uses them. Record the letters of any of the following which can be effects of stimulants.

a. Nervousness
b. Physical dependence on the drug
c. Flashbacks – experiencing the effects of the drug at a later time when the user has not taken the drug recently
d. Loss of appetite
e. Increased heartbeat rate

Remediation: (1) See the Remediation for WB-03-Core-7. (2) Check the student's answers to Self-Evaluations 5-1 and 5-2. (3) Discuss the cartoons on page 69. (4) The table on pages 142 and 143 lists physical and mental complications of stimulants, many of which are direct effects of the drugs.

WB 03 Core 9

Explains the effect of stimulants.

The student recalls the effect of stimulants on the body.

Student Action: Responding negatively and in effect that stimulants do not eliminate the need for sleep but simply postpone tiredness because they help the body use up its stored energy.

Performance Check A: Mr. Harrison is a long-distance truck driver. He says he takes pep pills, which are stimulants, when he is on a long haul because they eliminate the need for sleep caused by driving long hours.

1. Are pep pills really an effective substitute for sleep?
2. Explain your answer.

Remediation: (1) Check the student's answer to Self-Evaluation 5-5. (2) Have him review the first paragraph on page 69.

WB 03 Core 10

Explains the phrase *developing a tolerance to a drug.*

The student recalls what is meant by the phrase *developing a tolerance to a drug.*

Student Action: Stating, in effect, that developing a tolerance to a drug means that a person experiences decreasing effects per unit of the drug taken.

Performance Check A: What is meant when a person is said to be developing a tolerance to a drug?

Remediation: (1) Have the student review the second paragraph below question 5-3 on page 71. (2) Check his response to Self-Evaluation 5-3.

WB 03 Core 11

Matches hallucinogenic drugs with their sources.

The student recalls the sources of marijuana, mescaline, psilocybin, and LSD.

Student Action: Matching marijuana with hemp plant, mescaline with the peyote cactus, psilocybin with mushrooms, and LSD with fungus on grains.

A: 1. a, 2. b, 3. d, 4. c
B: 1. d, 2. a, 3. b, 4. c
C: 1. c, 2. d, 3. b, 4. a

Performance Check A: Match each drug with its possible source.

Hallucinogenic Drugs	Possible Sources
1. LSD	a. Fungus (mold) on grains
2. Marijuana	b. Hemp plant
3. Mescaline	c. Mushrooms
4. Psilocybin	d. Peyote cactus
	e. None of these

Remediation: (1) Have the student read the three paragraphs following Table 5-2 on pages 72 and 73 of the textbook. (2) Suggest that he try matching the chemicals in Table 5-2 with the plants in Figure 5-2. (3) Have him review the table on pages 142 and 143.

WB 03 Core 12

Judges the appropriateness of an operational definition.

The student applies the concept of operational definitions.

Student Action: Responding negatively and, in his own words, that the operational definition is a poor one because it is not closely related to the variable it purports to measure.

Performance Check A: A scientist is interested in measuring the effects of marijuana on a person's driving ability. Below is his operational definition of *driving ability*.

> A person's driving ability is detected and measured by his score on the written test of the rules of the road. The higher his score, the greater his driving ability is.

1. Is this a good operational definition of *driving ability*?
2. Explain your answer.

Remediation: (1) Ask the student what an operational definition is. If he cannot answer, discuss operational definitions with him, using the answers to questions 3-2, 5-5, and 5-28 in the Teacher's Edition of the *Record Book*. Point out that in each case the definition has two parts – a way to detect something and a way to measure it. If a Level I text is available, refer the student to pages 23 and 24. (2) If the student did Performance Check A, have him review pages 62 and 63 to see some useful operational definitions for *driving ability*. (3) Ask the student if he sees any difference between the test and the tasks described in the performance check and the DSST used in Excursion 5-2 and reaction time.

WB O3 Core 13

Predicts whether hallucinogens will affect everyone the same way.

The student applies the concept of the varying psychological effects of hallucinogens on different persons.

Student Action: Responding negatively and in effect that psychological effects would probably vary because of differences in sensitivities, body weight, and background.

Performance Check A: Suppose that two people took exactly the same amount of a hallucinogenic drug.

1. Would you expect them both to experience the same psychological effects?
2. Explain the reason for your answer.

Remediation: (1) Have the student review from below question 5-15 on page 76 through page 77. (2) Have the student review Figure 5-5 on page 77 and Table 5-6 on page 78.

WB O3 Core 14

Lists common undesirable effects of a hallucinogen.

The student recalls the common undesirable or unpleasant psychological and physical effects of the hallucinogen LSD.

Student Action: Stating the essence of at least four of the undesirable or unpleasant effects of LSD listed below.

(1) Hallucinations that may be frightening
(2) Flashbacks at a later time
(3) Dilated pupils
(4) Lowered body temperatures
(5) Increased heartbeat rate
(6) Chills
(7) Nausea
(8) Possibly long-term damage to chromosomes

Performance Check A: Suppose a good friend of yours has some LSD that he wants to try. He knows that you have been discussing the effects of hallucinogens in your science class. "What undesirable or unpleasant things could this LSD do to me?" he asks you.

List at least four different things you could tell him.

Remediation: (1) Have the student review the concepts from the last paragraph on page 73 and pages 77 and 80. (2) Have the student review the columns labeled "Possible Physical Complications" and "Mental Complications" in the table shown on pages 142 and 143.

Decides whether hallucinogens affect everyone the same way.

WB O3 Core 15

The student applies the concepts of the different effects of hallucinogens on different people and that their short-term and long-term effects may differ.

Student Action: Responding negatively and with the essence of the notions that hallucinogens produce different effects on different people and that a drug may produce long-term changes that are not easily detected over a short period of time or with specific long-range effects of that type.

Performance Check A: Don says that all this talk about LSD, a hallucinogen, causing bad effects is just meant to scare people. He says that he has taken LSD ten times in the last year and has had no bad effects.

1. Does Don's experience prove that hallucinogens do not produce any bad effects?
2. State two reasons which support your answer.

Remediation: (1) If the student has a problem recognizing the possible long-term effects of hallucinogens, have him read pages 80 and 81. As an additional remediation, check the student's answer to question 5-26 on page 80. (2) If the student doesn't realize that the effects of hallucinogens vary from person to person, have him review Table 5-6 and explain why Table 5-7 presents a range and an average rather than a single number.

Defines *placebo.*

WB O3 Core 16

The student recalls the definition of *placebo.*

Student Action: Stating to the effect that a placebo is a harmless substance containing no active medicine and that it is used when testing the effects of drugs on people.

Performance Check A: What is a placebo?

Remediation: (1) Refer the student to Problem Break 6-1 on pages 85 and 86. (2) Check the student's answer to question 6-1 on page 85.

Explains why placebos are used.

WB O3 Core

The student recalls the reason why placebos are used when scientists test the effectiveness of a drug.

Student Action: Responding, in effect, that placebos are used to separate the effects caused by a person's belief that there will be an effect and the effects caused by the drug itself.

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Performance Check A: When scientists test the effectiveness of a drug, they give some people placebos and some people the drug they are testing. Explain why they do this.

Remediation: See the Remediation for WB-03-Core-16.

WB 03 Core 18

Defines *double-blind experiment* and explains the reason for its use.

The student recalls the definition of *double-blind experiment* and why the procedure is used.

Student Action: Stating, in effect, that a double-blind experiment is one in which neither the experimenter nor the subject knows when the actual treatment or a placebo is being used and that this procedure is used to prevent the experimenter from showing bias toward either the treatment group or the placebo group, as well as to check for the mental effect on a subject of being part of an experiment.

Performance Check A:

1. Explain what is meant by *double-blind experiment.*
2. Explain why double-blind experiments are used.

Remediation: (1) Refer the student to the first paragraph on page 86. (2) Check his answer to Self-Evaluation 6-1.

WB 03 Core 19

Recognizes the characteristics of a double-blind experiment.

The student applies the concept of a double-blind experiment.

Student Action: Stating whether or not the experiment is a double-blind experiment and, in effect, that in a double-blind experiment neither the subject nor the experimenter knows whether or not the subject is receiving treatment.

A: No
B: No
C: Yes

Performance Check A: Jim wants to find out whether coffee that contains caffeine tends to keep people awake at night. To investigate this, he is giving his brother Tom and his sister Susan each a cup of coffee to drink every evening before they go to bed. Sometimes they get regular coffee and sometimes they get decaffeinated coffee. Tom and Susan never know which kind they are getting. Jim is keeping track of when they get the regular coffee and when they get the decaffeinated coffee and of how well they sleep.

1. Is Jim's experiment a double-blind experiment?
2. Explain your answer.

Remediation: See the Remediation for WB-03-Core-18.

States two reasons why laws are passed.

WB O3 Core 20

The student classifies two reasons why laws are passed.

Student Action: Stating, in effect, that some laws are passed to protect people from other people and some to try to keep people from doing things that certain lawmakers or a segment of society do not consider right for a person to do even though those things affect only the doer (moral laws). Relevant laws are suggested below.

A: 1. Protects the group from acts of the individual
2. Protects the individual from himself

B: 1. Protects the group from acts of the individual
2. Protects the individual from himself

C: 1. Protects the individual from himself
2. Protects the group from acts of the individual

Performance Check A: Your text suggests that there are two kinds of reasons why laws are passed. State the text's reason that each of the following laws was passed.

1. There shall be no shooting of guns within the city limits.
2. There shall be no gambling by persons under the age of 18.

Remediation: (1) Refer the student to the first and second paragraphs on page 88. (2) Check his answer to Self-Evaluation 6-2.

States the third reason for passing a law.

WB O3 Core 21

The student generates the concept that laws may be passed for reasons other than protecting one from others and from oneself.

Student Action: Responding negatively and to the effect that tax laws are passed to raise money to support the functions of government, such as maintaining a police and a fire department.

Performance Check A: In Chapter 6, you read that laws are passed for two reasons. One reason is to protect people from other people. The other reason is to support certain moral standards.

1. Does the following law fit one of the above categories?
   "Everyone buying things in Erie County must pay a 4% sales tax."
2. If it does, explain how. If it doesn't, explain the reason that such a law might be passed.

Remediation: (1) Ask the student to tell who gets the money which is raised in taxes. (2) Ask him what the money is used for. (3) Have him redo the performance check.

Selects examples of illusions, delusions, and hallucinations.

WB

The student classifies something as an illusion, a delusion, or a hallucination.

O3 Exc 5-1 1

Student Action: Indicating as an illusion something that seems different from what it really is, as a delusion a feeling or belief that is not really true, and as a hallucination something sensed that is not really there at all.

A: 1. I, 2. D, 3. I, 4. H, 5. D
B: 1. H, 2. I, 3. I, 4. D, 5. D
C: 1. D, 2. H, 3. D, 4. I, 5. I

Performance Check A: For each of the following, indicate whether it is an illusion (I), a delusion (D), or a hallucination (H).

1. While driving across a desert, a person sees water on the road in the distance.
2. A person believes that the whole world is designed for his benefit.
3. A driver stopped at a traffic light feels that his car is rolling backwards when he notices the car next to him moving ahead.
4. A person on an LSD trip says he tastes the music.
5. A person believes that if he wears anything yellow, he will have bad luck.

Remediation: (1) For a definition of *illusion*, refer the student to the first paragraph on page 118. (2) Also check his answer to question 5 on page 128. (3) For the term *hallucination*, refer the student to the second and third paragraphs on page 128. (4) Also check his answer to question 7 on page 129. (5) For the term *delusion*, refer him to the third paragraph on page 129.

WB O3 Exc 5-2 1

Explains the DSST as an operational definition for an entity.

The student applies the concept that an operational definition is a statement of how to detect and to measure an entity.

Student Action: Stating that the DSST is an operational definition of the specified entity because it is a way to detect and to measure the entity.

Performance Check A: The DSST was used with new and regular users of marijuana. The test could be thought of as an operational definition of *reaction time*. Explain why the DSST is an operational definition of *reaction time*.

Remediation: (1) Find out if the student can define *operational definition*. If he can't, let him read the note to the teacher for question 3-2 on page 50 of the Teacher's Edition. (2) Ask him to tell how the DSST answers both questions about the entity specified in the check.

WB O3

Distinguishes between the social effects of alcohol and marijuana.

The student applies the concept of the social effect of alcohol and the social effect of marijuana.

Student Action: Stating that the people at a loud and noisy party were probably drinking alcohol and the notion that alcohol seems to make people aggressive, whereas marijuana tends to make people passive and withdrawn.

EXC 5-3 1

Performance Check A: Larry and Kathy were walking home from a movie one evening. They passed one house in which a very loud and noisy party was going on. Larry said that it sounded like a pot party. Kathy thought it sounded more like a drinking party.

1. Were the people at the party more likely to have been smoking marijuana or drinking alcohol?
2. Explain your answer.

Remediation: (1) Have the student review page 138 of Excursion 5-3 and ask him on the basis of that page to predict the effects of marijuana on an aggressive football player. (2) Then have him reconsider his answer to the performance check.

Maps and Grids

ES WB

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Krakow
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Prague
Munich
Vienna
Angers
Zurich
Budapest
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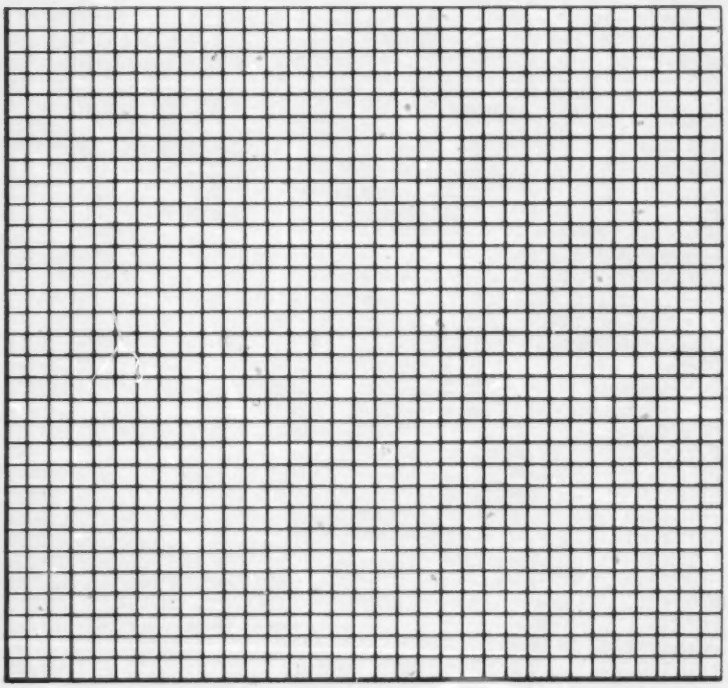
TOTAL NUMBER OF ACTIVITIES COMPLETED
DAYS IN CLASS